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A

Comprehensive Local Transportation Plan

FOR THE

CITY of CHICAGO

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General Development of Chicago

The private automobile has assumed an increasingly important part in providing local transportation, not only in Chicago but in practically every urban and rural area in the country. While the individual automobile is not recognized ordinarily as a mass transportation agency, the aggregate of movements of thousands of such vehicles is such as to force the recognition that it actually plays an important part in the general transportation picture. The report (Chapter II) deals with this agency as well as with major thoroughfares, superhighways, and related problems to the extent that seems warranted in a study of related factors that affect mass transportation.

A Modernized Transit System for Chicago

One of the most important problems—particularly from an engineering viewpoint—is the speeding up of all local transportation through improved rapid transit facilities and the extension of their use throughout the urban area by means of universal transfers between all lines as modernized and extended. This fast transportation is proposed to be supplied by elevated-subway rapid transit trains; by the operation of motor coaches over superhighways; by express bus operation over certain thoroughfares; and finally by coordination to the maximum extent possible with all suburban railroad services which naturally and logically fit into a general plan. Chapter III contains a discussion of the modernization of the transit system as thus proposed.

Subways in the Terminal District

Chapter IV is devoted to a discussion of the proposed terminal subway development. The adoption of a policy of constructing two-track subways is advocated with a view to reducing public expenditures and at the same time completing all of the units necessary at this time with the funds available. The soundness of such policy from the viewpoint of capacity of the downtown street system is proven conclusively. While only three or possibly four terminal subways are recommended for construction at this time, the additional units required to permit the removal of the entire Union Loop and provide capacity half again as large as required to accommodate all the present street railway, elevated railroad and bus traffic into and out of the central business district could be accomplished by an expenditure of $84,500,000 or only about $7,000,000 more than that involved in the construction of two subway units as proposed in the 1930 Traction Ordinance. When all such subways are built, there would still be more than half of the streets in the central business district which would be available for future subway expansion if and when required.

Modern Surface Transit Facilities

The methods proposed for improving and extending existing surface transit facilities are described and cost estimates given in Chapter V. Extensions of existing

local service into many districts which have developed beyond the reach of the present routes involving 130 miles of single-way motor bus routes are recommended. These extensions will bring additional and much needed transit facilities within the reach of more than 500,000 persons now without service or inadequately served. The immediate conversion to trolley coach or gas bus operation of 360 single track miles of street railway lines is one of the important features of the plan and will provide improved service to the car riders, lower operating expense to the company and much improved street traffic conditions to the general public. Another important feature of the plan is the provision of 170 single-way route miles of express bus routes. These routes will operate on important cross-town thoroughfares such as Ashland Avenue, Western Avenue and Central Avenue and in addition will provide vastly improved service over radial lines from outlying districts not now directly served by rapid transit facilities to the loop district. In addition to the existing express bus service operated over Lake Shore Drive to the north and Leif Eriksen Drive to the south, through routes to the central business district are proposed from South Chicago Avenue and 95th Street, Morgan Street and 87th Street, the Municipal Airport at Cicero Avenue and 63rd Street, North Avenue and Narragansett Avenue, Addison Street and Harlem Avenue, Milwaukee Avenue and Devon Avenue and Elston Avenue and Central Avenue.

Modernization of Equipment

Examples of the effect of modernization of local transit equipment on volume of riding have been witnessed in Chicago during the last eighteen months. The partial modernization of the equipment of the Chicago Motor Coach Company has so met popular approval as to cause an increase in traffic over the facilities provided by that company of more than 25 per cent. The purchase of 83 streamlined street cars of modern design—capable of more rapid speeds, almost noiseless in operation and containing so many other new features as to provide a new type of common carrier vehicle—has provided the patrons of the Madison Street car line with a service vastly improved over that afforded by the standard street car of a generation ago. Here, too, the public response to improved service has resulted in a substantial increase in traffic. Many other instances of the stimulus to new riding which has resulted from the installation of new equipment in cities throughout the country are cited on Page 47. Therefore, one of the important features of the transit plan proposed herein is the expenditure of large sums for new modern equipment, including elevated-subway cars, street cars, trolley coaches and gas buses. All of these improvements are covered in detail in Chapter V.

Extensions of Rapid Transit Service

Extensions of rapid transit service which have been requested from time to time and which are included in this transit plan are covered in Chapter VI. This report proposes no extensions of elevated rapid transit train structures at this time. In lieu thereof, express bus routes to be coordinated with the existing rapid transit system as modified and improved are proposed.

The use of suburban steam railroad facilities for rapid transit train operation has been covered by a preliminary investigation. While the study thus far indicates that there are many practical difficulties to be overcome in connection with proposals to operate rapid transit trains over existing steam railroad tracks or to construct new tracks for their operation on existing railroad rights-of-way at steam railroad track grade, there are possibilities for such operation or construction, particularly in the outlying portions of the city, which will and should undoubtedly be developed through future studies made by the local Transit Commission in connection with extensions of rapid transit train service which may be required.

It should be noted, however, that there are immediate opportunities for utilization of suburban railroad service through its coordination with the local transportation system by agreements covering transfers from one facility to the other. The notable success of the present inter-company transfers between the rapid transit trains of the Chicago Rapid Transit Company and the lines of the Chicago Surface Lines and with the lines of the Chicago Motor Coach Company, all independent and competing agencies, is shown by the traffic now amounting to approximately 38,000,000 passengers per annum. This successful joint service afforded by these separate companies indicates the probable success of such proposed transfers with steam suburban railroads. Informal preliminary conferences with officials of a number of railroad companies indicated their willingness to work out such an arrangement with the new company and transit commission.

Modern Rapid Transit Facilities

Plan "1"

All of the features of the proposed modernization and consolidation of the existing local transit facilities, including extension of local service, universal transfers, conversion of trolley lines to bus operation, provision of new trolley and bus equipment, installation and operation of express bus lines and future coordination of suburban railroad service are common to the several alternate plans considered for modernization of the rapid transit system.

Plan "1"—which is a study of the continuance of train operation on all branches of the Chicago rapid transit system—is discussed in Chapter VII. This plan contemplates a thorough going rehabilitation of the entire rapid transit system including repair and painting of all of the structures, relocation of stations throughout so as to provide spacing of approximately one-half mile (as compared with the present spacing of from one-quarter to one-third mile which prevails on a number of the branches), installation of a system of automatic block signals throughout and an equipment program designed to eliminate all wooden cars and the substitution therefor of light weight, high speed steel units embodying those improvements suitable for train operation which have been developed in the modern street car.

Subway improvements under this plan include a two-track subway in State Street and Chicago Avenue—to provide for the through movement of a substantial portion of the north and south rapid transit traffic—and a west side subway along Milwaukee Avenue, Lake Street, Dearborn Street and Van Buren Street from a connection with the existing Logan Square elevated structure near Ellen Street to a connection with the Garfield Park main line elevated structure near Sangamon Street. Another improvement for the northwest side car riders would come through the construction of a proposed subway terminal in Logan Square to provide for expeditious and convenient transfer to elevated-subway trains from street car and bus lines at that focal point.

Two downtown subways for the operation of street cars are recommended—one in Washington Street and the other in Jackson Street—which would not only provide a delivery for west side car riders to Michigan Avenue but would also permit the removal of all of the west side street cars from the loop district, thereby insuring a marked improvement in traffic conditions in this congested area.

Plan "A"

In the development of this plan—which is recommended for adoption—recognition is given to the increasing importance of the private automobile as a mass transportation agency. Plan "A" proposes the conversion of all elevated structures on the west side, except the Garfield Park line, to elevated highways and the operation of superhighway double-deck motor coaches to provide high speed service in place of the present elevated railroad train services.

A thorough investigation of the structural problems involved in the proposed conversion has been made from which it was determined that the existing structures have ample strength to carry with safety all highway loads which would be imposed thereon. The acquisition of additional right-of-way where needed and the use of existing public lands in streets and alleys is proposed so as to permit the construction in general of elevated highways having four full lanes for moving traffic. No access to abutting property is to be provided.

Superhighway coach operation is in general to be confined to the outside lanes with station stops at half-mile intervals so as to provide a pattern of service on the converted railway structures similar to that proposed in Plan "1". Widening of roadways opposite stations so as to provide special berthing facilities where needed and also at all ramps would provide for the full use of four lanes throughout. Downtown terminals for the superhighway coaches would be on the street surface, and the two west side street car subways proposed in Plan "1" would be a necessary preliminary to the operation of superhighway coaches to provide space for the coaches required. An unusual feature of this plan is the contemplated provision of underground storage under Grant Park so as to permit the downtown day storage of units operated inbound during the morning rush hours and outbound during the evening rush hours, thus avoiding the excess mileage and interference

with street traffic now caused by returning empty equipment to yards and terminals in the outlying districts.

Specifically, the plan provides for the development and modernization of three major rapid transit trunk lines for train operation from the central district—one to the north side, one to the south side and one to the west side. The plan provides an alternate for the northwest side, either the operation of superhighway coaches over an elevated highway to be built along Milwaukee Avenue from a point near Lake Street to connect with the existing Logan Square and Humboldt Park elevated structures to be converted to highways, or a rapid transit elevated-subway line along the Logan Square branch and Milwaukee Avenue subway as proposed in Plan "1". The elevated railroad structures which are specifically proposed for conversion to elevated highways are the Lake Street division, the Douglas Park branch and the section of the metropolitan elevated division along Paulina Street with connections to Ashland Avenue near Cermak Road on the south and near North Avenue on the north. These existing facilities would be supplemented by a new six-lane elevated highway to be built in Randolph Street from Jefferson Street to connections with the proposed Paulina Street and the Lake Street elevated highways just west of Union Park. Washington Boulevard and Warren Avenue are also connected by ramps to the Randolph Street elevated highway. Ramps would be provided at the terminals and at intermediate points spaced approximately one mile so as to provide convenient means of ingress and egress of individual automobiles using the superhighways. On four-lane structures ramps would be located in the center so as to permit direct access for individual motorists to the inner lanes thus insuring against any conflict with the movement of superhighway coaches in the outer lanes.

Plan "B"

A study of the complete conversion of all elevated railroad structures into superhighways was also made and is discussed in Chapter IX. Plan "B" is not recommended for the reasons stated in that chapter.

Sound Financial Program

A financial plan for the proposed modernization is set forth in detail in Chapter X. Estimates of gross revenues are based on conservative assumptions as to probable revenue traffic. The present figure for riding habit is assumed for the first four-year period, after which it is increased from the present figure of 257 per capita per annum by 2 rides per capita per annum. The conservatism of such assumption is evident from a consideration of the experience not only in Chicago but throughout the country of the increases in traffic which follow modernization. Here in Chicago, modernization on several routes has resulted in increases in traffic of from 10 to 25 per cent over the city-wide average.

The estimates of operating expenses are based on present experience of all three of the local companies. The increased wages which went into effect during the present calendar year are all reflected in these estimates which also contain a full allowance for the ultimate cost of social security taxes. While the estimates give effect to some of the economies from unification and from the elimination of duplication of service and costly competition resulting from the present uneconomical competitive setup, there is no question but that unified operation under efficient management will effect further economies.

In New York, conversion of obsolete street railway lines to modern bus operation has resulted in the phenomenal increase of revenue traffic of 95 per cent. Experience in many other American municipalities has been such as to give ample support to estimates of increases of 10 to 20 per cent during the modernization period. Some idea of the effect of modernization and extension of local transit facilities may be gained from examination of the records of increases of traffic following the extensive rehabilitation of the Chicago Surface Lines starting with the year 1907. The total revenue rides on this system increased from 372,000,000 in the year 1907 to 594,000,000 in the year 1912, during which period nearly the entire system was rehabilitated and extended.

However, based on these conservative estimates of revenue, it is shown that gross receipts will be sufficient to pay all operating expenses, liberal depreciation, city compensation, and still develop an improvement in net income.

Of the new permanent facilities proposed for construction, there are two—namely, subways and superhighways—which are not only necessary to adequate mass transportation service but will also be of general benefit to the community and, for that reason, are properly to be considered a public undertaking; the cost of which should be financed with public funds.

Funds required, both public and private, for the consummation of the proposed plan are entirely within the financial resources of the public and of the private companies. Costs of construction and equipment are based on present day prices with allowances for some advance in construction costs. Under the recommended plan, public construction costs will total approximately $62,000,000. The company will be required to furnish improvements in equipment and facilities costing $98,700,000 spread over a period of nine years. It is estimated that the net income (before city compensation) of the operating company will increase from a figure estimated at less than $4,000,000 for 1937 to over $14,000,000 in the tenth year of modernization (see Chapter X for details of estimated gross receipts, operating expenses, net income and capital required).

Benefits

The benefits to the City of Chicago which will result from the settlement of the entire traction problem and the adoption of a comprehensive plan are numerous. The more important of these are briefly described as follows:

Faster transit facilities will be available to street car and bus riders throughout the entire urban area. There will be a more frequent service which, together

CHAPTER VII

MODERN RAPID TRANSIT FACILITIES—PLAN "1"

ALL TRAIN OPERATION

Description of Coordinated Plan

Plan "1" contemplates the continuation of rapid transit train service over the present elevated structures with an enlargement of the terminal facilities by means of subways. Figure 29 is a skeleton map showing the basic rapid transit routes.

This coordinated plan provides for city-wide service with limited stop facilities furnished either by rapid transit trains, suburban railroad trains or surface express bus lines, all interconnected with a system of local street car or bus routes.

A system such as this would be the result if sufficient use of elevated train service is demonstrated to justify the expenditures necessary to perfect an operation of this type and magnitude. The Chicago Rapid Transit Company has assisted us by furnishing operating details covering studies along these lines. We have adapted these studies to meet the requirements of modernization and type of operation which we believe should be adopted as a standard by the City of Chicago.

The several facts relating to Plan "1" have been discussed earlier in the report. This plan represents the closest approximation to the present methods of providing rapid transit service by train operation. The basic surface transportation is the same under the three plans herein described except for slight modifications necessitated by the character of rapid transit service to be used.

Rapid Transit Subways

The construction of two rapid transit subways is contemplated as part of this plan.

(1) A two-track subway from a connection with the Northwestern elevated structure near Chicago Avenue, thence via Chicago Avenue and State Street to a connection with the south side elevated structure at a point south of Roosevelt Road and

(2) A two-track subway in Milwaukee Avenue from Paulina Street to Lake Street, thence via Lake, Dearborn and Van Buren Streets to a connection with the Metropolitan elevated at a point west of Halsted Street.

The State Street subway has long been considered an essential part of a rapid transit plan and has been recommended in practically every report on the subject of local transportation for the City of Chicago.

A subway terminal is planned for Logan Square so that rapid tra... would be reached quickly by stairways from the Milwaukee Avenue car... or express buses.

The proposed subway terminal would be connected to the Logan S... vated structure by an incline north of Fullerton Avenue, which incline wo... the subway portal just southeast of the present Logan Square station. S... and passage-ways would be so arranged that it would be unnecessary to c... car tracks in making the transfer. The suggested arrangement is shown ... 30. The subway section proper would be built by public funds to be utiliz... first link of a subway extension in Milwaukee Avenue which could be ... later beyond Logan Square.

The connections between subways and structural connections to elev... tures would be an obligation of the operating company, which company ... also be required to equip the subways with tracks, block signals and other ... operating equipment.

The subway connection or short cut for the Logan Square service is ... desirable to provide a more effective entrance to the central district from the ... west side. The continuation of this route through to the southwest via the ... is an added convenience and should result in operating economies.

Street Car Subways

The operation of the rapid transit subways will aid in reducing surface ... indirectly in proportion to the number of riders this service may attract who ... use automobiles or surface line routes. However, even an appreciable drop in ... on local transit routes will not materially affect street conditions. For exam... the service to the west and northwest on the surface would be diminished ... what by reason of improved rapid transit service due to subway operation, ... street car tracks would still be needed along Lake, Randolph, Washington ... Madison Streets for the Lake Street, Elston Avenue, Milwaukee Avenue and M... son Street cars. The slightly wider interval between the street cars would ... some effect but the obstructions due to passengers loading and unloading at ... roadway between the car tracks and the curb and the fact that street car movem... along the streets are definitely fixed in two moving lanes by the tracks that will ... still remain. Improved speed of mass transit and of all surface vehicles can ... substantially bettered only by the removal of street cars from downtown stre... Additional street space can be secured directly only through construction of st... car subways and, therefore, this plan includes the following:

(1) A street car subway in Washington Street from Desplaines Street to a ter... minal loop in Grant Park east of Michigan Avenue, and

(2) A street car subway in Jackson Street from the Van Buren Street tunnel ... to a terminal loop in Grant Park east of Michigan Avenue.

... factors relating to capacity and ultimate subway development are covered ... detail in Chapter IV.

... Transit Cars

... modernization program for rapid transit train service should provide for ... complete replacement of all wooden cars by modern steel cars. There are at ... present 456 all steel cars owned and operated by the Chicago Rapid Transit Com... These cars, while not entirely modern, do have safety and comfort features ... are mechanically adapted to be fitted in and used with modern equipment.

... the completion of the proposed modernization program, such wooden ... may be needed temporarily should be strengthened with steel frames, and ... cars should be provided with multiple control for more efficient operation. ... the magnitude of the task of rehabilitation of the entire system, an eight-... program is proposed. During this eight-year period wooden cars would be ... out. Based on estimates of riding which would follow a resumption of the ... trend which existed prior to 1929, some 920 steel cars would be required ... the ninth year in addition to the 456 now owned. Thus, the replacement pro... would include the purchase of 115 new and additional cars each year for ... years.

... capacity and design of new cars is still a matter for further study. The ... furnished us by the Chicago Rapid Transit Company were based on a car ... 52 passengers and using a rush hour standard of 80 per car. However, some... larger units could be operated with a resulting decrease in operating expenses.

New subway cars of the heavy type being used in the Independent or Municipal ... in New York City cost $42,000 each. Such an expenditure is too great to ... the rapid transit operation in Chicago to be financially successful. A new ... of car is required with set characteristics generally similar to those of the ... C. C. surface car now used on Madison Street. Such a car could be the same ... slightly greater length than the present P. C. C. car, seating 60 or more passen... but would be more roomy because of its greater width and lesser waste space. ... the street surface cars now can be acquired for little more than $15,000, a rapid ... car of sufficient strength and fully equipped for train operation with ... modern improvements we believe could be purchased from $22,500 to ... each.

The development of such a rapid transit car is now actually in progress. The ... design offers the possibility for securing standard type equipment that ... be produced in quantity and adapted to rapid transit service.

Other Rapid Transit Improvements

A considerable number of other improvements are needed to bring the present ... to first-class condition so as to meet the necessary requirements of safety ... operation and for improving terminal and station facilities.

Pending the purchase of new cars as above stated, a considerable numbe
old wooden cars should be strengthened by installing steel frames and ma
reinforcements at an estimated cost of about $1,000,000.

According to the recent survey and inspection by Mr. Frank A. Randall
sulting Structural Engineer, the initial structural replacements are estim
$2,000,000 and deferred painting at $750,000. Mr. Randall estimates tha
tural replacements, after the property has generally been reconditioned
about $200,000 per year with an additional expenditure of $100,000 p
for painting.

Proper standards of safety for high speed train operation can only be
complete installation of automatic block signals throughout the entire rapid
system. Such an installation is estimated to cost about $1,250,000. Some
sharper curves should be eliminated or radius lengthened to provide for
speeds, safety and increased comfort. The estimated expenditures for corre
alignment would be about $1,000,000. Eventually about $2,000,000
should be spent for noise elimination by ballasting the present open dec
structures in locations where relief from train noise is particularly needed.

The spacing of stations on the existing elevated railroads is the result
layout designed for competitive operation years ago. With unification of all
facilities stations should be rearranged so as to provide a spacing of two per
or less. In the rearrangement of stations several of them must be relocated requ
ing the building of entirely new stations. Ramps to provide direct connection fr
trains to express buses at Lawndale and North Avenues, also at 63rd Street
Stony Island Avenue, would make the transfer between the two types of ser
convenient and with a minimum loss of time.

Rapid Transit Routes and Service

The principal service for the north and south sides would be operated thro
the State Street subway. This service would be supplemented by additional tra
coming in to the central business district on the present elevated loop from bo
the north and south divisions. Service would be operated through the West S
subway from Milwaukee Avenue (Logan Square and Humboldt Park branche
via Lake, Dearborn and Van Buren Streets, thence through to the Garfield P
and Douglas Park branches of the present Metropolitan elevated system.
Lake Street service would be operated entirely over the elevated structure as
present while a portion of the Logan Square service would be operated over
Paulina Street structure and into the loop over the present route. Some supp
mentary service from the Garfield Park and Douglas Park branches would also
operated over the elevated loop.

Stations would be relocated so as to be spaced at approximately half mile
intervals, thereby enabling this train service to function essentially as a rapid trans

ride for long haul riding, leaving short local rides to be handled over the surface.
Estimates have been prepared by the Chicago Rapid Transit Company which show
that by using a standard of 80 passengers per car in the rush hours and with an
increase in riding of 65 per cent, the rides originating on the rapid transit system
would be 3.73 per car mile as compared with 3.00 at present. Undoubtedly it
would require some time to build up a 65 per cent increase in riding even with
modernization and rapid transit modernization. With a lesser increase the rides per car
mile would also be slightly lower because lighter traffic densities make it more
difficult to make schedules to fit its demand. With an increase of 10 per cent in
riding and with the advantages of modern equipment, 3.5 rides per car mile might
be expected.

Relation of Other Facilities

Modern rapid transit train service as outlined in this study would be coordinated with bus and street car routes to reach territory which cannot be served directly by rapid transit. Express bus service will supplement local surface lines and contact rapid transit train service. The steam railroad service should be coordinated with the basic transit scheme to provide as far as possible for uniformly good service throughout the city.

The details for the complete modernization and coordination of other transit facilities with the basic rapid transit layout are given in Chapters V and VI.

Benefits

The modernization of the existing rapid transit operation as proposed in Plan "1" would be of material benefit to the car riders, the public at large and to the transit company.

The rapid transit routes would be made accessible through universal transfers to practically all parts of the urban area. Long haul rapid transit riders would be provided with comfortable, commodious and safer equipment. Operation would be speeded up materially through the elimination of unnecessary station stops, by operation through modern subways in the now congested terminal zones and through the use of speedier cars provided with ample door space to reduce standing time at stations. An outstanding example of this is the estimated reduction of running time from the Logan Square terminal to the boundary of the Loop from the present schedule—22½ minutes to 11½ minutes. Time savings throughout the city would be realized—similar in general to those shown in the time zone map prepared for Plan "A" (Chapter VIII).

With the rearrangement of stations a more convenient transfer from surface to rapid transit facilities would be provided in numerous locations. Ramps to provide direct delivery of surface passengers to elevated railroad platforms are provided at two locations initially. Further installations of a similar character would undoubtedly be required.

As discussed in Chapter IV, the subways in the central district to be built initially under this plan would conform to an ultimate complete plan permitting the removal of the loop structure. To repeat, the additional two-track subway connecting units required to effect this long sought improvement would be:

1. A subway in Lake Street from Milwaukee Avenue to a connection with the elevated structure west of Halsted Street,
2. A subway in Clinton Street (or some parallel street west of the river) from Van Buren Street to Milwaukee Avenue, and
3. A subway in Wells Street (or some parallel street east of the river) from Chicago Avenue to Polk Street.

The construction of these three essential connections would involve a total estimated additional expenditure of approximately $22,000,000.

The development of this plan would be of indirect general benefit, in that through the improvement of rapid transit service, there would be some decrease in the number of street cars and buses on radial thoroughfares and on the streets in the central district due to the more complete transfer of long haul riders to the off-grade rapid transit lines. To the extent that automobile riders would be attracted to the modernized service, the automobile traffic load on major thoroughfares would be reduced.

The inclusion of the two proposed west side street car subways in Plan "1" insures a radical improvement in traffic conditions in the loop district proper by clearing all east and west streets in the loop of car tracks. The following number of superhighway coaches under Plan "A" (Chapter VIII) would also be eliminated from surface operation in the maximum half hour under Plan "1" (all train operation) as outlined herein:

Lake Street	50
Randolph Street	66
Washington Street	42
Madison Street	76
Monroe Street	16
Total	250

Company Expenditures

The capital requirements for the rapid transit service of the operating company are estimated to be as follows:

SUMMARY OF IMPROVEMENTS TO BE INSTALLED BY OPERATING COMPANY

RAPID TRANSIT—PLAN "1"

Rebuilding old cars for temporary use	$ 1,000,000
920 Modern cars	20,700,000
Automatic Block Signals	1,250,000
Initial structural replacements	2,000,000

Structural replacements (5th to 9th year)	1,000,000
Deferred painting	750,000
Station relocation	150,000
Improvements at interchange points	390,000
Improved structural alignment	1,000,000
Noise elimination	2,000,000
Ramps for buses (Lawndale and North Ave. 63rd and Stony Island)	180,000
Equipping State Street subway	1,150,000
Equipping West Side subway	2,200,000
Equipping Logan Square terminal	500,000
Connection to State Street subway	600,000
Total	$34,870,000

This expenditure of $34,870,000 will all be required during the first nine years of operation; the major part of it will be required in the first four years. The 920 modern cars would be acquired at the rate of 115 per year for the first eight years. They would replace all of the present elevated cars in operation with the exception of 456 steel cars. This replacement rate is sufficiently rapid to have steel cars available for operation in each of the subways when completed.

Public Expenditures

PUBLIC EXPENDITURES FOR SURFACE FACILITIES

Street car subway—Washington Street	$ 5,600,000
Street car subway—Jackson Street	4,400,000
Paving Program	3,875,000
Total	$13,875,000

These expenditures from public funds would all be made during the first four years of operation.

The public funds required for the various improvements in rapid transit subways, street car subways and paving improvements for trolley coach or bus lines as outlined under Plan "1," would be as follows:

PUBLIC FUNDS REQUIRED—COMBINED OPERATION—PLAN "1"

Washington St.—Street Car Subway	$ 5,600,000
Jackson St.—Street Car Subway	4,400,000
West Side Rapid Transit Subway	25,500,000
State St.—Rapid Transit Subway	18,000,000
Logan Square Subway Terminal	1,890,000
Street Repaving	3,875,000
Total	$59,265,000

These expenditures would be all made during the first four years and would require an intensive program of subway building.

Private Capital Requirements—Combined Operation

The surface program of Plan "1" differs from Plan "A" (detail of surface program given in Chapter V) only in that 85 P. C. C. cars, 42 buses and 61 trolley coaches will be required in addition to those required under Plan "A," because in the latter plan surface equipment to that amount would be displaced by superhighway coaches operating over the surface.

The company expenditures of the surface and high speed divisions combined for the first nine years are shown in the following tabulation:

COMBINED COMPANY EXPENDITURES—9 YEARS—PLAN "1"

Passenger Equipment—Surface Lines	$ 46,699,900
Track Rehabilitation	15,075,000
Other Surface Line Improvements	10,379,600
Passenger Equipment—Motor Coach	2,700,000
Other Improvements—Motor Coach	108,000
Passenger Equipment—Rapid Transit	20,700,000
Other Improvements—Rapid Transit	14,170,000
Total	$109,832,500

The combined estimates call for an expenditure of $109,832,500. The actual cash required during the nine years will be less than shown if equipment is purchased on equipment trust notes. The ability of the operating company to finance an expenditure of this magnitude will depend primarily on the earnings that may be expected from such a combined operation.

This phase of each plan is discussed fully and the results compared in Chapter X.

CHAPTER VIII

MODERN RAPID TRANSIT FACILITIES—PLAN "A" TRUNK LINE TRAIN OPERATION COMBINED WITH SUPERHIGHWAY COACH ROUTES

During the past twenty years there have been numerous plans for the extension and modernization of the rapid transit system, none of which have materialized. Of the four major extensions which have been built during this twenty-year period, only one—the installation of third and fourth tracks on the Northwestern Division main line from Lawrence Avenue to Howard Street—has been of substantial benefit to the City of Chicago proper.

While there have been innumerable discussions of plans to modernize the rapid transit system through the relocation of stations, construction of additional tracks and structures and—most important—purchase of new and modern equipment, yet no definite plan has been put forward recently for financing such improvements.

Based on the urgent necessity for off-grade thoroughfares in Chicago and the lack of a plan for the financing of a modernization program for rapid transit train operation by the Chicago Rapid Transit Company, a survey of the existing elevated railroad structures has been made to determine their availability for conversion into useful portions of a city-wide superhighway system. Such a system of elevated highways then could be utilized to provide an extension of rapid transit service by motor coaches and at the same time provide superhighways for all motor traffic.

Plan "A" has been prepared, providing for the conversion of some of the elevated railroad structures to superhighways upon which the mass transportation service will be supplied by the operation of double-deck superhighway coaches. It is an alternate to Plan "1" which provides for rapid transit entirely with train operation (see Chapter VII). This plan recommends train operation over the Garfield Park and north and south divisions, as these routes appear to be best adapted to trunk line rapid transit train service. It is recommended that the Logan Square, Humboldt Park, Douglas Park and Lake Street elevated lines be converted to superhighways. The proposed superhighway coach operation would be expanded to include important extensions over the street surface, notably along Milwaukee and Central Avenues. This basic plan is shown graphically in Figure 31. The present rapid transit service is shown in Figure 32.

Train and Superhighway Coach Operations

Rapid transit train operation would consist of three trunk line services—one to the north, one to the west and one to the south. The north and south trunk line would furnish service between the terminals of the Ravenswood branch and the

Northwestern main line as at present to the terminals of the Englewood, Normal Park and Jackson Park branches, operating in the central business district either through the proposed State Street subway or over the tracks on the west and south sides of the Union Loop. Service to the west side would be provided by train operation on the Garfield Park branch from the city limits and beyond to the Union Loop and the Wells Street terminal. Future enlargement of this Garfield Park trunk line so as to provide three or four main line tracks west of Marshfield station can be accomplished when the traffic demand increases.

Service from Lake Street and from Central Avenue would be routed over the proposed Lake Street superhighway to terminals at street grade in the central business district. Superhighway coaches operating from the west along North Avenue and the proposed Humboldt Park superhighway, also along Milwaukee Avenue and the proposed Logan Square-Milwaukee Avenue superhighway would be operated over the new Milwaukee Avenue superhighway to terminals in the central business district. Douglas Park service would be provided by the operation of superhighway coaches over Cermak Road from the city limits and beyond, joining with the Paulina Street and the Randolph Street superhighways to street grade in the central business district. A through cross-town superhighway coach service would also be afforded by the operation of express bus service between north and south side terminals on Ashland Avenue via the Paulina Street superhighway. In addition, a system of cross-town surface express buses would contact the high speed system at many points.

These rapid transit routes coordinated with improved local and express bus service, together with street car subways in the central district, would provide for a unified transit system serving all portions of the urban area by utilizing surface street car and local bus routes for the secondary distribution system.

Proposed Conversion of Existing Elevated Railroad Structures to Superhighways

While the primary purpose of this study has been the development of improved mass transportation facilities, the pattern of the existing elevated railroad system has been studied to determine the adaptability of the several branches to city-wide superhighway development. A Lake Street superhighway, supplemented by an elevated highway in Randolph Street (as herein proposed) would fit admirably the necessity for a west side superhighway serving the northerly portion of the west side of the city. The section of the Logan Square elevated railroad which is parallel to Milwaukee Avenue would, if directly connected to the central business district by a suitable off-grade highway, constitutes a usable addition to existing highway facilities serving the northwest.

The development of elevated highways by the conversion of the existing Douglas Park and Humboldt Park branches as well as that portion of the elevated system between the Douglas Park and Logan Square branches which runs north

and south just west of and parallel to Paulina Street would constitute very valuable portions of the proposed system of cross-town superhighways along Cermak Road, North Avenue and Ashland Avenue. The structure along Paulina Street if provided with ramps leading to Ashland Avenue near Cermak Road on the south and near North Avenue on the north—would provide not only a most useful off-grade structure for the operation of cross-town express bus service on the proposed Ashland Avenue route, but would serve also as a first unit in the outer distributor system proposed at the limits of the central district.

Cermak Road is now an excellent, wide thoroughfare west of the city limits and also east of Archer Avenue. With the existing Douglas Park elevated structure widened to four lanes and converted for superhighway purposes, it would be necessary to build a structure in only that portion between Paulina Street and Archer Avenue in order to provide an express highway from the lake front to Du Page County, where it would connect with the Cermak Road-Butterfield Road superhighway development.

North Avenue west of Western Avenue is a minimum of one hundred feet in width. That section between Western and Austin Avenues has an eight-lane roadway throughout. West of the city limits this thoroughfare has been developed with divided roadways and a splendid wide right-of-way so that it can be developed as required into a real superhighway to the Fox River on the west.

The short section of elevated highway proposed in the initial layout along North Avenue will be of value for transportation purposes but should be provided with extensions both east and west for highway purposes. The necessity for extending this superhighway west may not become evident for a considerable period, but it is anticipated that the need for an extension east will develop shortly. Such an extension could be made by the construction of an elevated highway on or parallel to North Avenue from the proposed Logan Square elevated highway to a point near Clark Street and the construction of a broad roadway at grade from that point connecting to Lake Shore Drive.

The existing elevated structure now used for Douglas Park and Logan Square trains paralleling Paulina Street is but a short distance west of Ashland Avenue, and its conversion into a four-lane elevated highway between Cermak Road and Division Street would provide an excellent by-pass for through traffic in the congested area west of the center of the city. It would be necessary to make some substantial expenditures for real estate and structural improvements in order to provide connections with surface streets at the north and south terminals, but with such connections an off-grade highway over four miles in length would be provided, and with connections to widened Ashland Avenue both north and south. This superhighway could be extended both north and south along the general line of Ashland Avenue in later years as the necessity for such extensions becomes evident.

Conversion Beyond City Limits

Changing from elevated railroad operation to express coach operation over elevated highways within the corporate limits of Chicago immediately presents the problem of operating such express facilities in the suburban areas outside the city limits now served by the Chicago Rapid Transit Company.

In the west suburban district, existing service provided by the Lake Street and the Douglas Park elevated branches could be replaced by service operated over Lake Street and Cermak Road. In lieu of the present crossing gates at street intersections with the rapid transit right-of-way on the surface, coordinated traffic signals should be installed along the surface extension of this highway. It has frequently been proposed that superhighway facilities be built through the densely developed west suburban area by both the State and County Highway Departments. Until such thoroughfares are constructed, however, reasonably satisfactory express coach service can be operated on suitable routes over existing thoroughfares at street grade.

Function of Terminal Subways

Before any of the existing elevated railroad structures could be utilized for highways, provision must be made for a change in street use in the central business district. That the roadways in and near the central business district under the present type of use are utilized at points to their utmost capacity—particularly during the rush hours of the day—is a matter of common knowledge. It is contemplated, therefore, that a substantial number of the street cars now operating at grade in this congested area be removed from the street surface as a preliminary to the construction of elevated highways.

This plan, therefore, includes the construction of two subways serving the west and northwest sides, which would eliminate the operation of all of the west side surface cars in the loop district. These terminal subway units and total estimated cost of each are as follows:

(1) *Washington Street Subway*—A two-track low level subway in Washington Street from Desplaines Street to a terminal loop east of Michigan Avenue (utilizing the existing Washington Street tunnel under the Chicago River) $5,600,000

(2) *Jackson Street Subway*—A two-track low level subway in Franklin Street and Jackson Street from a connection with the existing Van Buren Street tunnel to a terminal loop east of Michigan Avenue 4,400,000

Structural Problems

Most of the existing elevated structures were built in the decade between 1890 and 1900. The present pattern of the several routes of the Chicago Rapid Transit Company is the result of building most of this system 40 years ago when the

necessities of a competing transit agency, economy in construction and location of the then existing commercial and residential areas were dominant factors in the location of these routes.

Loading Used for Original Design

Information on loadings assumed in the original design is contained in a paper by Dr. J. A. L. Waddell on the design of the North Western Elevated Railroad Structure in Chicago (Transactions of the A.S.C.E.—1897—Vol. 97). Dr. Waddell stated in his paper that similar loadings were utilized in the design of other Chicago elevated structures built about that time.

Live load was based on a 40-foot motor car with two four-wheel trucks spaced 25 feet center to center, with axles on each truck spaced 5 feet center to center. A load of 30,000 pounds per truck was used. The loading was based on the use of a motor car followed by trailer cars of same dimensions as the motor car with loadings of 20,000 pounds per truck.

Highway Loads

H-20 loading and distribution is generally used in design of structures in metropolitan areas by highway departments throughout the country. This loading is described in Standard Specifications for Highway Bridges and Incidental Structures of the American Association of State Highway Officials (1931).

This loading and distribution consists of a 15-ton truck with 14-foot wheel base followed at a 30-foot interval by a 20-ton truck with 14-foot wheel base and this in turn followed by 15-ton trucks at 30-foot intervals. Loadings for 15-ton trucks are 6,000 pounds on front axle and 24,000 pounds on rear axle. Loadings for 20-ton trucks are 8,000 pounds on front axle and 32,000 pounds on rear axle. Impact of 1/3 of the live loads is added. The dead load which will be added to the existing structure consists of an 8-inch reinforced concrete deck slab with railings and necessary appurtenances.

It has been assumed that double-deck motor coaches similar to the new coaches operated by the Chicago Motor Coach Company (Y. C. Model 720) will be operated on the proposed elevated highways. This coach has an 18-foot 1-inch wheel base and when fully loaded (100 passengers at 150 pounds) produces a load of 12,750 pounds on front axle and 24,300 pounds on rear axle.

Analysis of Strength of Structures

Inasmuch as the loads imposed by double-deck buses are less than those assumed in the H-20 loadings the latter loading has been utilized in this analysis. In making this study no deductions in net area of the original sections were made. The average age of the elevated railroad structures in Chicago is more than 40 years, so that there are some points where original thickness of steel has been reduced by corrosion.

A field inspecton and report on this subject made in September, 1937 by Mr. Frank A. Randall, Consulting Structural Engineer, states:

> "The quality of the metal on the structures is not in question. Examination and tests have shown that the metal was good originally, and that it has not been affected by the so-called 'fatigue' of metal during its service life. Even the actual loss of metal by rust and corrosion is in general very slight, and appreciable loss occurs only at isolated spots. * * * However, it may be that fatigue contributes to the extensive cracking in the top flange angles of the stringers, especially where there is repeated deflection under trains."

Speaking of the entire system of elevated structures, Mr. Randall further reports:

> "To carry out the work of thoroughly reconditioning the structures, it is our judgment, based on our inspection and experience, that an initial expenditure of $2,000,000 (or $10.00 per ton throughout) will be required plus an expenditure of $750,000 to bring deferred painting up to date. For ordinary maintenance work, in the way of minor repairs and replacements, an annual sum thereafter of $200,000 should be ample; and an annual expenditure of $100,000 for painting."

An analysis of various typical structures in the elevated railroad system shows that the stresses developed by either H-20 loading or loaded double-deck buses of the type now in use would be less than those allowed by present day practice in the design of similar new structures. Therefore, these existing structures could be converted to elevated highways without strengthening.

Details of Proposed Conversion

In view of the fact that practically all of the proposed elevated highways will be utilized by motor buses carrying traffic now handled by elevated railroad trains and, further, that the passenger vehicles utilizing these structures should be permitted to operate at relatively high speeds, practically all structures have been planned on the basis of lanes 11 feet in width. This is a 10 per cent greater width than has been utilized for years in planning major thoroughfare facilities but is in line with most modern thought in highway design which reflects the need for greater clearances for rapidly moving streams of modern motor traffic. Figure 33 shows typical methods of converting wide elevated railroad structures to highways, the cross sections shown in this figure being typical of the existing structure on Lake Street. Typical methods of converting other elevated structures are shown in Figure 34.

Substantial guard rails are contemplated for all elevated highways. The guard rails are separated from the roadway by a curbing. On four-lane highways a center division curb is to be provided to separate opposing streams of traffic and may also be used as an emergency walk and to provide space for lighting standards. All roadways are provided with a very flat crown, sloping generally from the outside to the center of the structure. Snow removal may be accomplished through special

openings located under or near the center division curb as well as at the outside railings.

All highways are to be provided with the most modern system of highway lights. No final determination has been made of the exact type of lighting to be provided, but estimates of cost are based on the use of modern lamps suspended by brackets along the roadways. It has been tentatively planned to provide a substantial concrete pavement on elevated structures. However, at special locations, use may be made of steel grid open type wearing surface or other special forms as conditions may be found to require when the final design is made.

In order to determine the practicability of operating urban transportation service by coaches over elevated highways as converted, in lieu of the existing rapid transit train service, a detailed examination was made of the Lake Street branch of the Chicago Rapid Transit Company system as typifying conditions that may be found throughout the system. This structure can readily be converted to a four-lane highway throughout its length from the Chicago River to Long Avenue near the west city limits. The location is such that it fits admirably into the pattern of the proposed city-wide superhighway system and it is located entirely on public property.

It was found that the present rush hour traffic on this structure is such that it can be handled by double-deck coaches operated in one lane in each direction. In view of the fact that such coaches must make station stops and that the station platforms are most conveniently located on the outside of the structure, the structure has the effect of providing six lanes at station stops of which the coach operation would be conducted on the outer lane. Figure 35 shows the plan and profile of the Lake Street elevated structure converted to a superhighway. Except for the ramps in the vicinity of Laramie Avenue (which are to be utilized by motor coaches terminating there) all ramps are located in the center of the structure. This will permit passenger vehicles to enter and leave the structure without crossing the outside lanes occupied by motor coaches. Figure 36 shows plan, profile and typical section of a proposed four-lane elevated highway at center ramps. Ramps are to be built on a maximum gradient of 6 per cent with suitable vertical curves and will have, in addition, a sufficient space at the connection to the elevated highway proper so as to permit the temporary standing of vehicles on the structure awaiting an opportunity to enter the moving traffic stream. Figure 37 shows a perspective of a typical center ramp.

In the case of the Lake Street project, it is contemplated that there will be an express coach service with no stops between Cicero Avenue and Paulina Street. At the intermediate local stops in this express zone, six lanes are designed so as to provide berthing space for local coaches making the station stop, thus eliminating any delay in the by-passing of local coaches by express coaches at these points. Figures 38 and 39 show the proposed development at such stations.

Supplemental terminal facilities have been provided in the form of an elevated highway along Randolph Street extending from Jefferson Street on the east to a connection with the Lake Street and Paulina Street elevated highways on the west. The initial stage of this development near Union Park is shown in Figure 40. Figure 41 shows the ultimate layout of ramps and connections in the vicinity of Union Park. Connections are proposed to extend from Randolph Street and Ogden Avenue to the Paulina Street superhighway. Two ramps are planned coming to grade near Paulina Street, one for westbound traffic to Washington Boulevard and the other for eastbound traffic from Warren Avenue. It will be noted that the connecting highway from Lake Street west of Ashland Avenue to Randolph Street east of Ogden Avenue is to be constructed so as to avoid crossing at grade either westbound traffic to Washington Boulevard or eastbound traffic on the Lake Street superhighway. This layout is illustrated in the perspective, Figure 42. Figure 43 shows a typical section of the proposed six-lane Randolph Street elevated highway. Figure 44 shows the layout of improvements proposed near the east terminal of the Randolph Street structure. It should be noted that the portals to the proposed Washington Street subway are located on Desplaines Street so as to eliminate street car operation at or east of Jefferson Street. Special treatment is also suggested at Logan Square (Figure 45) so as to permit superhighway coaches to enter directly into Milwaukee Avenue from the highway structure.

The principles developed in the Lake Street study can be applied generally to the other structures. The estimates which have been prepared covering the superhighway development are based in general on ramp and station layout and design similar to that developed on the Lake Street structure. The estimates contain reasonable allowances for acquisition of private right-of-way where such right-of-way is necessary to the proper and adequate highway layout.

Estimates of Construction Cost

The following estimates of cost are based on a somewhat detailed study of the proposed Lake Street elevated highway. The figures developed in this study covering ramps and stations have been applied to determine the probable cost of the conversion of the remainder of the branches. The cost of the land and buildings to be acquired for widening structures, coach stations and ramps have been determined by field reconnaisance. The summarized estimates of costs of the several elevated highways, together with a brief description of each, are as follows:

Cermak Road (Douglas Park Branch) $4,700,000

This project consists of a 4-lane highway with center ramps for passenger automobiles and side platform coach stations from Kildare Avenue to a connection with the Paulina Street highway.

Lake Street (Lake Street Division) 6,750,000

This project consists of a 4-lane highway from Long Avenue to the Chicago River, a 2-lane highway from the Chicago River to a terminal ramp in North Wacker Drive at Washington Street,

a terminal ramp and pavement from Long Avenue to Austin Avenue. Ramp and station location and design are shown in Figure 35.

Randolph Street Highway 3,250,000

This project consists of a 6-lane highway from Jefferson Street to Ogden Avenue with a 2-lane connection from Randolph Street near Ogden Avenue to the Lake Street elevated highway near Ashland Avenue, a 2-lane connection to the Paulina Street elevated highway and a 2-lane ramp to Washington Boulevard near Paulina Street; also a 2-lane ramp to Warren Avenue near Paulina Street. The grades of the Lake Street connection and Washington-Warren connection are proposed to be separated where the superhighway crosses Ogden Avenue—see Figure 40. The project also includes ramps in Randolph Street near Ann Street and Halsted Street and also terminal ramps in Jefferson Street from Randolph Street to Washington Boulevard, from Randolph Street to Lake Street and also in Randolph Street from Jefferson Street to Clinton Street.

North Avenue (Humboldt Park Branch) 590,000

This project includes a terminal ramp from North Avenue to a connection with the existing structure just west of California Avenue and a 2-lane highway from California Avenue to the Logan Square junction.

Logan Square (North of North Avenue) 1,330,000

This project consists of a 2-lane highway from North Avenue to a terminal ramp at Logan Square.

Milwaukee Avenue Highway 4,140,000

This project consists of a 4-lane highway with center ramps for passenger automobiles and side platform coach stations from North Avenue to Lake Street. It also includes the separation of grades at the intersection with the Paulina Street elevated highway.

Paulina Street Highway (Douglas Park and Logan Square Branches) 7,400,000

This project consists of a 4-lane highway with center ramps for passenger automobiles and side platform coach stations from a terminal ramp just south of Cermak Road to a terminal ramp just south of North Avenue with grades separated at Garfield Park branch and Logan Square branch.

SUMMARY OF ESTIMATES

Cermak Road Highway	$ 4,700,000
Lake Street-Randolph Street Highway	10,000,000
North Avenue Highway	590,000
Logan Square-Milwaukee Avenue Highway	5,470,000
Paulina Street Highway	7,400,000
Total	$28,160,000

It should be specifically noted that these estimates include no allowance for acquiring the necessary real estate or structures now owned by the Chicago Rapid Transit Company.

Maintenance Costs

In addition to the initial reconditioning of the elevated structures it will be necessary to provide for certain annual recurring maintenance charges as follows:

Painting and Structural Maintenance	$200,000
Cleaning, Snow Removal and Roadway Maintenance	11,000
Lighting	42,000
Total Initial Annual Maintenance and Operating Expense (1st 10 years)	$253,000
Roadway Repair (11th and succeeding years only)	210,000
Total Annual Maintenance and Operating Expenses (11th and succeeding years)	$463,000

Benefits

In comparing the results to be obtained through the operation of superhighway coaches on the proposed superhighway structures with operation of buses on the surface of the streets, and considering the effects on general traffic the following factors are among those which show the benefits of superhighway operations:

(1) The full width of the structure will be preserved at entrance and exit ramps so as to avoid the creation of throats at such localities.

(2) Reservoir space will be provided for vehicles entering the elevated highways so as to permit temporary stops while awaiting an opportunity to enter gaps in moving traffic streams. This will have the effect of filling the gaps between groups of vehicles which are usually found on thoroughfares at grade.

(3) Freedom from grade crossing interferences and dangers.

(4) Freedom from traffic control signal delays and the subsequent bunching of vehicles.

(5) Absence of possible collisions with cars moving on the wrong side of the highway to pass other vehicles.

(6) Freedom from and safety for pedestrians.

Speeds

It is suggested that minimum as well as maximum speed regulations be adopted so as to prevent slow moving vehicles from impeding the orderly movement of vehicles traveling at recognized safe cruising speeds. Observations taken on free running sections of state highways—both inside and outside of the metropolitan district—by the Illinois Highway Department indicate average cruising speeds to be approximately 40 miles per hour. The establishment of a minimum speed of 35 miles per hour and a maximum of 45 miles per hour will insure the utmost in

benefits to all motorists desiring to use the elevated highway system. This will be a reasonable regulation in that motorists who desire to travel at lower speeds can continue to utilize existing roadways at street grade. With the establishment of such minimum and maximum limits, an average cruising speed of 40 miles per hour will be attained. However, in computing overall travel time it will be necessary to make some allowance for delays at entrance and exit ramps and for normal delays which are bound to occur as the result of vehicles traveling at the lower limits. It seems reasonable to estimate, however, that the probable average of overall speeds will be at least 90 per cent of the average cruising speed or 36 miles per hour.

While the primary object of this study is the development of improved facilities for mass transportation, a limited discussion with respect to the collateral uses and benefits which will accrue to all traffic by reason of the provision of new, off-grade thoroughfares will be of interest.

Traffic counts made by the City of Chicago, the Chicago Park District, the State Highway Department, the Works Progress Administration and other agencies have been studied to determine the extent of the use that would be made of the proposed city-wide system of elevated highways when constructed. In determining the probable use, consideration was given to the higher overall speeds made possible through operation over elevated highways with grades separated throughout as compared with those now possible on street roadways at grade.

Assuming the effective radius of use of the elevated highways to extend one mile in each direction at the outer limits, the total traffic which will be diverted to the new thoroughfares eventually may exceed the capacity of the elevated highways included in this plan. However, these superhighways will have adequate capacity to accommodate all present traffic which will be attracted to them with the possible exception of the proposed Milwaukee Avenue structure.

The benefit which would accrue to motorists throughout Chicago through facilitating their daily movements to and from the central business district is indicated by the fact that the total normal daily traffic will be approximately 20 per cent of the total of all traffic (street cars and buses operating on the surface, excepted) in and out of the central business district as shown by the cordon count of May, 1937.

In view of the fact that most of the highways provide through routes and will conform to a pattern which will attract long distance riders, it is estimated that the probable average length of ride on the system will be 3 miles or more. Based on an approximate estimate of 100,000,000 vehicle miles per annum and estimated average speeds of 36 miles per hour as compared with a 20 miles per hour average surface speed, the estimated time saving will total approximately two and a quarter million vehicle hours per annum.

There will be a further benefit in that the major portion of these trips will be removed from street surface—thus eliminating a substantial portion of the traffic

hazard inherent in operation of motor vehicles in metropolitan cities at street grade. There will be a corresponding benefit in the reduction of volume of traffic on existing roadways at street grade. This will also benefit pedestrians crossing principal thoroughfares and make the use of such thoroughfares safer and easier for the remaining motorists whose trips are of such length or of such character as require them to continue their present travel at street grade.

Studies of traffic flows and accidents on various types of roadways have been made by the Traffic Engineering Section of the Chicago Park District. These studies cover various typical boulevard roadways at grade and also sections of the grade-separated outer drives. Analysis of these data show that the average car miles per accident on the grade-separated section of the north outer drive is approximately 515,000 while the average on eight typical boulevards at street grade is approximately 121,000. If it is assumed that these latter figures are fairly representative of the accident ratio on streets at grade throughout the city and that the figures for the outer drive furnish a fair measure of the improvement in safety on superhighways, then the probable number of accidents incident to the operation of 100,000,000 car miles over the proposed elevated highway system as compared with the present operation at street grade will be reduced from 826 to 194 per annum.

The property owners both along the lines of proposed elevated highways and along other major thoroughfares will share in the benefits, as residents and property owners along such thoroughfares as Washington Boulevard and Jackson Boulevard will find a reduction in volume of present traffic streams. Along the elevated highways, property owners and residents will materially benefit from elimination of the noise inherent in the present elevated railroad operation on unballasted tracks. The substitution of comparatively noiseless operation of vehicles on rubber will effect a substantial improvement of the present annoying conditions. The net result will be in general to enhance property values along the lines of the proposed elevated highways and within their sphere of influence throughout the city. One of the most important results to be accomplished by the proposed plan will be the elimination of the north and east portions of the Union Loop now on Wabash Avenue and Lake Street.

Superhighway Coach and Train Operation

Service Requirements

Service for the operation of Plan "A" has been computed based on checks of passenger loads carried by the Chicago Rapid Transit trains at present.

The Chicago Rapid Transit Company takes daily checks of passenger traffic at points which indicate the peak load requirements for the individual branches. These counts are made at Chicago Avenue on the north; at Roosevelt Road on the south; at Marshfield station for the Metropolitan division and at Halsted Street for the Lake Street division on the west. These regular counts are made by one man, estimating passengers by groups of ten. More accurate checks indicate these estimates to be generally high so that they will be adequate to cover any variation from the absolute peak along the route.

In setting up service requirements the count taken on Wednesday, April 7, 1937, was used as the basis. This particular day was selected as it represented about an average day, neither high nor low, free from the acute midwinter seasonal peak and also free from the midsummer seasonal slump. It should therefore represent about the average service requirements on the system. A brief summary of loads checked appear herewith in Table 12.

In estimating the service required 10 per cent was added to the loads shown by the passenger check. This was done as a precaution to insure a reasonably close estimate of what the requirements would be on a rehabilitated system on which increased business would naturally be expected.

TABLE 12

CHICAGO RAPID TRANSIT COMPANY

SUMMARY OF COUNT OF INBOUND PASSENGERS—WEDNESDAY, APRIL 7, 1937

	Half Hr. Period Ending	Douglas Pk. at Marshfield	Garfield Pk. at Marshfield	Logan and Humboldt at Marshfield	Lake St. at Halsted	South Side at Roosevelt Rd.	Ravenswood at Chicago	Wilson-Howard-Evanston at Chicago
A.M.	7:30	1160	1720	2070	1210	4390	1880	2490
	8:00	2210	3190	4080	2990	5360	3570	5900
	8:30	2640	3490	3880	6500	5870	5680	9560
	9:00	1500	2570	2150	5290	4790	3940	8370
	9:30	770	1010	930	2110	2520	1780	3410
	10:00	640	710	630	1080	1650	910	2440
	10:30	470	770	540	880	1480	850	2000
	11:00	470	540	450	850	1420	800	1600
	11:30	390	480	380	840	1230	730	1650
	12:00	380	480	350	670	1120	680	1220
P.M.	1:30	320	560	300	550	980	470	1340
	2:00	290	460	310	560	920	530	1160
	2:30	230	380	340	580	990	450	1180
	3:00	280	380	280	450	910	460	1080
	3:30	330	480	330	530	. . .	520	1280
	4:00	280	360	290	530	. . .	630	1290
	7:30	250	450	280	380	970	220	800
	8:00	370	450	290	450	840	320	1030
	8:30	280	410	260	300	780	170	720
	9:00	130	120	150	290	560	130	620
	9:30	80	100	100	180	480	100	560
	10:00	50	160	130	130	470	70	370
	10:30	90	150	90	90	440	80	420
	11:00	70	90	80	150	430	100	280
	11:30	110	180	140	110	390	70	360
	12:00	70	140	110	80	330	60	240

TABLE 12

CHICAGO RAPID TRANSIT COMPANY

SUMMARY OF COUNT OF OUTBOUND PASSENGERS—WEDNESDAY, APRIL 7, 1937

	Half Hr. Period Ending	Douglas Pk. at Marshfield	Garfield Pk. at Marshfield	Logan and Humboldt at Marshfield	Lake St. at Halsted	South Side at Roosevelt Rd.	Ravens-wood at Chicago	Wilson-Howard-Evanston at Chicago
P.M.	1:30	340	340	210	420	820	360	840
	2:00	350	430	260	460	950	380	1080
	2:30	350	440	330	560	960	430	1000
	3:00	490	500	440	570	1060	510	1360
	3:30	520	520	480	750	1220	640	1310
	4:00	610	570	830	860	1550	790	1750
	4:30	910	1210	1280	980	1850	1060	1910
	5:00	1670	1200	2340	1670	3340	2120	4030
	5:30	2880	3860	3640	4490	5850	4950	8530
	6:00	2630	2950	3180	3870	5050	4410	8130
	6:30	1040	2060	1570	1820	3780	2500	4900
	7:00	760	940	1120	860	2640	1320	2270
	7:30	490	610	620	570	1770	580	1610
	8:00	330	560	390	420	1850	580	1240
	8:30	300	510	300	420	1440	640	1190
	9:00	330	430	300	410	1430	490	1120
	9:30	400	390	310	510	1130	540	1300
	10:00	350	450	310	460	950	470	1050
	10:30	260	450	280	260	970	450	910
	11:00	320	410	260	360	1010	340	1080
	11:30	300	350	240	380	850	420	850
	12:00	170	350	200	160	630	320	650

Type of Coach

The passenger loads to be carried indicate that the traffic is of sufficient density to require the use of double-deck coaches entirely. It has been assumed that a 72-seat vehicle similar in design to the new coaches now in service on the Chicago Motor Coach Company routes will be used, although it should be recognized that changes in design and in body construction may be developed better to adapt it to this service. With respect to coaches, their mechanical performance is constantly being improved and the Diesel engine is being developed for coaches of this type with its advantages of economy and high torque under operating speeds.

Consideration of all factors involved indicates that one-man operation is the most economical way of rendering this service. The number of stops for passengers, boarding and alighting per trip, on this class of long-haul service are few compared with those for local surface service. The work of fare collection can be further reduced by the use of fare collectors at the times and places of maximum loading.

Since a second man is not needed for improving the operation of the vehicle in a service of this type, the only purpose he might serve would be as an added factor of safety. However, experience does not indicate that the second man contributes to safety. On the contrary, by having the matter of opening and closing doors directly under his sole supervision and responsibility, the driver is less confused when stopping and starting for passenger interchange.

Evidence of these statements is indicated by the accident records of the system of the Chicago Motor Coach Company which for the past six years (1931 to 1936) has been one-man operated exclusively. During that period the bus miles operated per accident increased 69.4 per cent and the number of passengers carried per personal injury increased 6.7 per cent as compared with the six years previous (1924 to 1929) when most of the buses on the system were operated by two men. Operation over off-grade highways, as compared with this surface operation, will further contribute to the safety of passengers and minimize pedestrian accidents.

Loading Standards for Coach Service

The present Chicago Rapid Transit cars provide 50 seats per unit. The new double-deck motor coaches provide 72 seats per unit. So, although a higher average loading per unit than exists at present is used as the standard for this coach operation, a larger proportion of the passengers will be supplied with seats.

In computing the service required, rush hour service was set up on the basis of an average of 85 passengers per coach for each half hour on each division during the rush hours. Since this standard is for a coach with 72 seats, it means that on the average 13 persons per coach are standing; that is, the standees represent 18 per cent of the number of seats. This is a high service standard for rush hour traffic. The selection is influenced by the fact that the comfortable standing room is limited to the lower deck on a coach of this type which does, however, offer good reserve capacity for occasional overloads that may result under actual operating conditions. That an average rush hour load of 85 per coach is a practical standard to use is evidenced by checks of the Chicago Motor Coach Company service, of which the following is typical:

CHICAGO MOTOR COACH COMPANY—ROUTE 51

OUTER DRIVE AND SHERIDAN ROAD LIMITED

PASSENGER LOAD COUNTS ON NEW DOUBLE-DECK COACHES

MAY 3, 1937

A.M. RUSH SOUTHBOUND AT OAK STREET *Time*	*Coaches*	*Passengers*	*Average Passengers Per Coach*
8:00-8:15	9	751	83
8:15-8:30	6	521	87
8:30-8:45	5	456	91
8:45-9:00	6	505	84
9:00-9:15	3	251	84
Total—A.M.	29	2484	86

P.M. Rush Northbound at Chicago Avenue *Time*	*Coaches*	*Passengers*	*Average Passengers Per Coach*
4:45-5:00	2	172	86
5:00-5:15	4	366	92
5:15-5:30	4	372	93
5:30-5:45	3	257	86
5:45-6:00	3	215	72
6:00-6:15	6	586	98
Total—P.M.	22	1968	89

The maximum load carried on any coach observed was 103 passengers. These checks are representative of normal performance throughout the year. During the summer vacation period the loading falls somewhat below that shown above.

The improvement in number of seats offered is illustrated in Table No. 13, which shows the average passengers per car carried by rapid transit trains during the maximum half hour, morning and evening (as indicated by the count taken April 7, 1937) as compared with the results had coach service been operated using a standard of 85 passengers per coach. This comparison indicates that while under the present rapid transit service 69 per cent of the rush hour patrons are seated, 85 per cent would have been seated under the proposed coach service. In view of these facts, the standard selected should reasonably meet the requirements for good service.

For off-peak service, a coach seating 72 was provided for every 64 passengers, as shown by the average for each half hour period. This allowance for variations gives a reasonable assurance of a seat for every passenger outside of the rush hours. The greater frequency of service provided by single units instead of trains of cars will in itself represent an improvement over the present service.

Scope of Operation for Coach Service

The usefulness of this plan of operation and the operating methods will depend to a large extent on how much of the area of the city will be served; that is, the extent to which superhighway coaches can be extended over the surface successfully to give direct service to areas which now can avail themselves of rapid transit only by transferring one or more times and then usually with the inconvenience of an added walk of half a block or more and a climb up the elevated stairs. Obviously unification is required to make such extension of superhighway coach facilities over the surface effective.

TABLE 13

PER CENT OF PASSENGERS SEATED BY PRESENT ELEVATED SERVICE (APRIL 7, 1937) COMPARED WITH PER CENT THAT WOULD BE SEATED IN COACHES (USING STANDARD OF 85 PER COACH)

Line	*Direction*	*Actual Passengers*	No. of Cars "L"	No. of Cars Bus	Average Per Car "L"	Average Per Car Bus	Per Cent Seated "L"	Per Cent Seated Bus
Period 8:00-8:30 A. M.								
Douglas	E	2,640	44	31	60.0	85.2	83.3	84.5
Garfield	E	3,490	62	42	56.3	83.1	88.8	86.6
Logan	E	2,540	39	30	65.1	84.7	76.8	85.0
Humboldt	E	1,340	23	16	58.3	83.8	85.8	86.0
Lake Street	E	6,500	81	77	80.2	84.4	62.3	85.3
Jackson Park	N	2,600	35	31	74.3	83.9	67.3	85.8
Englewood	N	2,870	35	34	82.0	84.4	61.0	85.3
Kenwood	N	400	8	5	50.0	80.0	100.0	90.0
Wilson-Kenwood	S	930	16	11	58.2	84.6	86.0	85.1
Howard-Evanston	S	7,990	96	94	83.2	85.0	60.1	84.7
Wilson	S	640	12	8	53.3	80.0	93.8	90.0
Englewood-Ravenswood	S	5,680	64	67	88.8	84.8	56.3	84.9
		37,620	515	446	73.0	84.3	68.5	85.4
Period 5:00-5:30 P. M.								
Douglas	W	2,880	41	34	70.2	84.7	71.2	85.0
Garfield	W	3,860	57	46	67.7	83.9	73.8	85.8
Logan	W	2,450	32	29	76.6	84.5	65.3	85.2
Humboldt	W	1,190	19	14	62.6	85.0	79.8	84.7
Lake	W	4,490	63	53	71.3	84.7	70.2	85.0
Jackson Park	S	2,770	40	33	69.3	83.9	72.2	85.8
Englewood	S	2,610	35	31	74.6	84.2	67.0	85.5
Kenwood	S	470	11	6	42.7	78.3	100.0	91.9
Howard-Evanston	N	7,030	88	83	79.9	84.7	62.6	85.0
Wilson	N	1,500	31	18	48.4	83.3	100.0	86.4
Ravenswood-Englewood	N	4,950	56	58	88.4	85.3	56.6	84.4
		34,200	473	405	72.3	84.4	69.2	85.3

NOTE: Present rapid transit cars seat 50 passengers; superhighway coaches would seat 72 passengers.

Expanding the rapid transit service by extending the superhighway coach operation, suggested under this Plan "A", over the surface could be accomplished by:

(1) A route extended along Central Avenue from Lake Street to Milwaukee Avenue, and replacing most of the present local bus service.

(2) A route extended along North Avenue to Narragansett Avenue.

(3) A route extended along Milwaukee Avenue to Devon Avenue. One branch of this route would be extended over Addison Street.

These extensions will increase the accessibility of superhighway coaches in the west and northwest sections of the city. Such an expansion besides increasing the scope of express service introduces economies in surface operation.

Downtown Coach Storage

It is planned to provide storage in the downtown district for the superhighway coaches which make trips inbound during the morning rush hour and then are not required in service until they are needed for outbound trips in the evening peak. Such downtown storage facilities will eliminate the expense of running these rush hour buses back empty; will prolong the life of the vehicles; will provide a centrally located point for bringing coaches to the line in case of emergencies and above all will greatly reduce the congestion of streets due to the elimination of empty vehicles. About 300 coaches could use this storage to advantage on weekdays.

The logical location for such a storage facility is in Grant Park. There are also parcels of real estate owned by the present companies which may be suitable for this purpose. Possibly more than one location could be provided thereby reducing congestion at focal points. The building of underground structures for various purposes has been accomplished in other cities and this method could very well be used here. The Grant Park location would lend itself to underground storage without interfering with the normal park development. This location too would adapt itself to use for automobile storage by the general public in the evening when crowds gather for public events, as the garage space would not be needed for coaches during those hours.

The capital required for this public project could be amortized by a rental charge to the operating company for the benefit it receives.

Downtown Routing of Coaches

The coaches coming in on the superhighways will operate over the surface streets in the downtown area. Efficient use should be made of the street space to accommodate them with the least possible interference. This will be done through eliminating most of the street cars from the downtown streets by constructing street car subways in Washington Street and Jackson Street (see Chapter IV).

The superhighway coach service would be routed through the central district as shown in Figure 46. The lines from Logan Square and the northwest would operate principally over Lake and Randolph Streets. The Lake Street line would operate over Washington and Madison Streets with rush hour service on Randolph Street. The Douglas Park line would utilize Madison and Monroe Streets. The eastern terminal for these west side lines would be in part at Dearborn Street and, in part, as far east as Michigan Boulevard. The west side street car subways will likewise deliver and receive passengers as far east as Michigan Boulevard.

Use of streets as shown by the flow of mass transit vehicles on the surface (street cars and buses combined) under the present operation as compared with the use that will be made by the superhighway coaches under Plan "A", are illustrated in Figures 47 and 48. Comparison is made of the maximum half hour of the morning rush period. The superhighway coaches shown in Figure 48 would accommodate 10 per cent more passengers than are now carried by the Chicago Rapid Transit lines over the routes that are converted.

If the superhighway bus operations are extended over the surface in outlying districts with further loads coming downtown, the volume of traffic will be increased proportionately. A further comparison of the use that would be made of the streets by mass transit vehicles as compared with the present use is shown in Table 14, which is a tabulation of the number of mass transit vehicles passing through the point of maximum use on each street in the maximum half hour of the morning rush hours.

Some increases in mass transit traffic are noted on streets that are now carrying less than their share of the load. Substantial reductions in the number of vehicles operated, however, are made on streets having severe traffic congestion, resulting in an average decrease through the peak points on the street of about 14 per cent.

Running Time of Coaches

Modern coaches are capable of crest speeds of nearly 50 miles per hour. Through a speed limiting device or governor the crest speeds in general are limited to 45 miles per hour. On a well constructed highway, free from pedestrians, traffic signals, cross traffic and interference of private automobiles and other vehicles, this crest speed could be maintained on non-stop runs.

In actual operation, however, there is some interference between coaches and automobile traffic running in the same direction and at varying speeds. These occasional interferences cause momentary slow downs, bringing the average down from the crest to a cruising speed that is dependent on the physical conditions of the route. In superhighway operation the friction between express and local coaches will be slight. By-passes provided at local stops, where expresses pass locals, will provide freedom of movement for both these classes of service. Opposing traffic will be separated by a center division strip.

TABLE 14

COMPARISON OF COMBINED STREET CAR AND BUS UNITS PASSING THROUGH DOWNTOWN STREETS

PLAN "A"

Number of Mass Transit Vehicles Passing Between 8:00 and 8:30 A. M. Through Point of Maximum Use on Each Street Within Area Bounded by Harrison Street, Michigan Avenue, Lake Street and Wells Street.

		(a) AFTER COMPLETION OF WEST SIDE STREET CAR SUBWAYS		
Street	PRESENT *Max. 2-Way Units*	PROPOSED *Max. 2-Way Units*	*Units Increase or Decrease*	*% Increase or Decrease*
Wells	63	100	+ 37	+ 58.7
La Salle	14	28	+ 14	+100.0
Clark	106	106	...	....
Dearborn	85	86	+ 1	+ 1.1
State	215	122	— 93	— 43.3
Wabash	109	109	...	....
Michigan	290	226	— 64	— 22.1
Lake	53	70	+ 17	+ 32.1
Randolph	70	81	+ 11	+ 15.7
Washington	115	105	— 10	— 8.7
Madison	95	85	— 10	— 10.5
Monroe	59	41	— 18	— 30.5
Adams	52	25	— 27	— 52.0
Jackson	104	57	— 47	— 45.2
Van Buren	39	23	— 16	— 41.0
Harrison	43	42	— 1	— 2.3
Total	1512	1306	—206	— 13.6

(a) With Douglas Park, Logan Square-Humboldt Park and Rapid Transit Service given by Superhighway Coaches.

There is no way of computing exactly the effect of automobile traffic on bus operation. The best gauge of operating results under such conditions can be obtained by studying the results of non-stop bus operation in the sections of the outer drive that are relatively free from cross traffic. The section that most nearly approaches the conditions of an elevated superhighway carrying heavy traffic loads is Lake Shore Drive from North Avenue to Belmont Avenue. This is the middle drive through Lincoln Park. The results of a series of checks of bus speeds in this section are summarized in the following table. In addition to the average, the median—or middle trip—is shown which would eliminate excessively high or low results that might unduly affect the averages.

CHICAGO MOTOR COACH COMPANY

RESULTS OF SPEED CHECKS OF NEW BUSES ON LAKE SHORE DRIVE TRIPS BELMONT AVENUE TO NORTH AVENUE—2.35 MILES

	AVERAGE		MEDIAN TRIP	
	Seconds	*M.P.H.*	*Seconds*	*M.P.H.*
19 A.M. Trips—July 28 and 29, 1937	231	34.75	230	34.90
14 A.M. Trips—July 30, 1937	248	32.31	250	32.11
12 P.M. Trips—August 2, 1937	241	33.31	237	33.87
14 P.M. Trips—August 3, 1937	226	35.52	248	32.37

The average of the 59 trips taken in the A. M. and P. M. rush hours showed speeds of about 34 miles per hour. Nineteen morning rush hour trips which were taken over two successive days showed average speed of nearly 35 miles per hour.

These average speeds were attained under conditions that are more severe than would be experienced on an elevated superhighway. No lanes are segregated for the use of buses and there are irregularities in the roadway surface where the crowns of intersecting roadways meet that would not be experienced on superhighways. Some cross traffic by pedestrians is also present. These averages represent speeds made under conditions approaching the maximum use of roadways.

From the results of these checks it would appear evident that on an elevated highway, where facilities are provided to minimize the possibilities of interference, a safe average cruising speed for motor coaches of 35 miles per hour can be maintained under virtually all conditions.

In addition to the cruising speed the overall time from terminal to terminal will depend on the number of stops, actual stopping time and the rates for acceleration and braking. Acceleration rates of 1¾ miles per hour per second and braking rates of 2½ miles per hour per second are well within the range of the coach performance and passenger comfort. The length of stop may vary from less than five seconds for off-peak riding and ranges from 12 to 20 seconds in the pick-up zone during the rush hours.

Considering these factors the following speeds are believed to be representative:

For regular operation with approximately 2 stops per mile ..... 23.0 m.p.h.
For express operation with runs of 2 miles or more ..... 30.0 m.p.h.
For loop streets in direction of heavy traffic ..... 5.0 m.p.h.
For loop streets in direction of light traffic ..... 7.5 m.p.h.
For outlying surface streets with 4 stops per mile ..... 15.0 m.p.h.

The effect of unfavorable weather on superhighway coach speeds appears to be a minor consideration. Even with street surface operation the Chicago Motor Coach Company does not find it advisable to operate slower schedules in the winter time than in summer. The greatest slowing down occurs during severe storms when visibility is affected. Such storms affect all forms of transportation. Sleet storms likewise affect street railway transportation as well as bus operation. Slip-

pery pavement condition due to rain or snow will, however, affect coaches when off-grade-rail transportation is not affected, except for blocking up of switches during severe snow storms.

The slowing down of surface traffic that occurs at such times is in a large measure due to the extra precaution that must be taken at intersecting streets. The fact that cross traffic is eliminated from the superhighway operation will remove that condition. In all it appears that, while the possibilities of slowing down because of bad weather are slightly greater with superhighway coach operation than with elevated train operation, such occurrences are not sufficiently frequent or conditions so severe as to be a deterrent to use of this type of service.

A source of delay incident to any transit operation is mechanical failure of the vehicle while in service. In train operation the motor failure of one car may not affect the service seriously as it can be carried "dead" by the remaining motor cars. Truck failures, of course, might affect the operation of the entire train. There is likely to be a higher proportion of mechanical failures with coach operation, but such failures affect fewer riders than in the case of rapid transit trains or street cars as the coaches following may pass the standing vehicle and are not held up as in the case of rail cars, where the lead car has broken down.

As indicated, slower speeds may be expected in the terminal district, possibly down to 5 miles per hour. It should be remembered that rush hour scheduled speeds around the loop are down to 9.2 miles per hour, and that the proposed service has the advantage of an improved delivery with the easy access provided by curb loading.

Closely related to the running time and performance characteristics is the resultant spacing that occurs under various headways. This is illustrated in the following table:

SPACING OF COACHES IN FREE RUNNING ZONE
AT GIVEN SPEEDS—LENGTH NEGLECTED

Buses per Hr.	*Headway in Seconds*	*40 m.p.h. 58.7 ft./sec.*	*35 m.p.h. 51.3 ft./sec.*	*30 m.p.h. 41.0 ft./sec.*
240	15	880 ft.	770 ft.	660 ft.
180	20	1,173	1,027	880
120	30	1,760	1,540	1,320
90	40	2,347	2,053	1,760
72	50	2,933	2,566	2,200
60	60	3,520	3,080	2,640

Even with a 15-second headway at the normal running speed (35 m.p.h.) there would be a full city block between coaches. The limiting factor is at the stops where coaches slow down, stand, and then accelerate. There the spacing is reduced. This is illustrated in Figure 49 which shows the relative position of two coaches during the stopping cycle. This example assumes a 10-second stop and a

20-second headway. There is still a 4-second gap between the time the first coach leaves and the second arrives. This indicates that the limiting headway per bus lane is 16 seconds less whatever the stopping time may be reduced from 10 seconds. This situation, however, can be improved by the simultaneous unloading and loading of two or more coaches where the length of platform is sufficient.

Figure 50 shows the relative position of local coaches (15-second headway) making half-mile stops, compared with an express coach making 2-mile stops. In the 2-mile run six locals are passed. It should be noted that the passing occurs at a point near the stopping place where the local coach would, for the most part, be pulled into a by-pass.

Relative Speeds of Present and Proposed Rapid Transit

A matter of considerable interest is the relative speed of superhighway coaches as compared with rapid transit trains. The figures developed as reasonable running times for the proposed coach operation for the routes selected for Plan "A" and the present train schedule speeds are shown in Table 15. Since the routes in the downtown district do not coincide with the present rapid transit routes, direct comparisons cannot be made for the full length of line. However, this table shows the present running time in comparison with that proposed over the comparative sections where the two operations do coincide. In every instance the present operation with rapid transit trains is slower than that believed to be possible by coaches over the superhighway portion of the run.

To carry the comparison farther it is desirable to consider the effect that slower speed in the terminal area due to running on the surface will have on the overall running time as far as the individual passenger is concerned. While in some instances, due to the slow surface speeds, slightly greater time will be required than at present; to most locations, due to more direct routing, the trip can be made in shorter overall time.

TABLE 15

PROPOSED RAPID TRANSIT OPERATION—PLAN "A"

RUNNING TIME IN MINUTES FROM CITY LIMITS OR OUTER TERMINALS TO LOOP BOUNDARIES COMPARED WITH PRESENT RAPID TRANSIT OPERATION

	PROPOSED		PRESENT	
	Regular (Min.)	*Express (Min.)*	*Regular (Min.)*	*Express (Min.)*
	Superhighway Coaches		*Present Trains*	
Logan Sq. to Market and Lake (Logan Sq.)	13.5	...	22.0 (F)	...
Austin to Market and Lake (Lake St.)	20.0	19.0	24.3	22.7 (H)
Kenton-21st to Canal (Douglas Park)	21.0 (C)	...	23.0 (D)	...

	Modern Trains		Present Trains	
Howard to Kinzie (North Side)	26.5	24.0 (A)	31.0	27.0 (G)
Wilson to Kinzie (North Side)	15.0	...	23.0	18.0
Kimball to Kinzie (Ravenswood)	24.5	22.5 (B)	31.0	28.0
Austin to Desplaines (Garfield Park)	20.5	...	24.0	22.0 (E)
63rd and Loomis to Harrison (Englewood)	24.0	...	31.5 (J)	27.5 (J)
Jackson Pk. to Harrison (Jackson Park)	22.5	...	29.5 (J)	24.0 (J)

(A) Express—Lawrence to Chicago—(approximately ⅓ of service)
(B) Express—Belmont to Chicago—(approximately ⅓ of service)
(C) To Canal and Randolph
(D) To Canal and Van Buren
(E) Express—Laramie to St. Louis
(F) Terminal at Franklin and Jackson
(G) Express—Loyola to Chicago
(H) Express—Hamlin to Transfer and Transfer to Halsted
(J) To Congress and Wabash

Modern Cars for Train Operation

For the train operation on the north and south divisions and the Garfield Park branch it is proposed that all of the operation be conducted with steel cars. This will require the purchase of some new equipment which should be modern in all essentials (as described in Chapter VII). It should have characteristics similar to the P. C. C. street car, but could be more roomy because of its greater width and lesser waste space.

Rehabilitation and New Construction

In order to put the rapid transit system in first-class condition for train operation, improvements, other than new cars would be required. The elevated structure itself is in need of considerable rehabilitation, particularly painting, and the replacement of some structural members will be required.

Several sharp curves which are a deterrent to high speed operation should be eliminated. This would require the acquisition of additional right-of-way and the rebuilding of a portion of the structure. This, however, may be deferred pending completion of other improvements. A complete automatic block signal system is necessary immediately to permit safe, fast train operation. In the process of eliminating stations that are little used, it will be found desirable to relocate some of the existing stations so as to serve the territory more effectively.

In previous rapid transit plans, provision was usually made for laying extra tracks along some of the present two-track and three-track sections outside of the loop district. We do not believe that such construction would be urgent at this time because of the decrease in riding that has occurred since the peak in 1926. Greater track capacity will be acquired through the use of larger cars and better spacing of stations.

Rapid Transit Stations

In Plan "A" it is proposed that the rapid transit stations be spaced approximately at one-half mile intervals which, by reducing the number of stops, will permit a greater use of crest speeds both by superhighway coaches and rapid transit trains, even in the pick-up areas. A comparison of the present number of trains with the proposed number of superhighway coaches shows that about three times as many coaches will be operated past a station in the superhighway coach service, therefore, the waiting time for the passengers will be reduced and the accumulated crowds on the platforms will be only one-third of what they are at present. This will add materially to the convenience and comfort of passengers.

At some of the outlying superhighway coach stations in the residential districts where considerable numbers of persons board in the morning, fare collectors would undoubtedly expedite coach loading. Accordingly, it is contemplated that such collectors be stationed at a number of the more important outlying stations during the morning rush hours. They could later be used at the heavier stations in the business and manufacturing districts to help handle the peak loads at those points in the evening.

Rapid Transit Operating Data

The modern rapid transit cars operated in trains will seat 60 or more passengers and, with the considerable amount of standing room, would provide adequate rush hour capacity for 100 passengers. The off-peak train service is based on average loads of 50 passengers. With stops spaced at half-mile intervals, and with the rapid braking and acceleration of this equipment, improved speeds will be possible throughout the system.

The superhighway coaches can be operated with the maximum loading standard of 85 passengers for rush hour and 64 for non-rush hour. Using these standards the equipment required and car miles operated for Plan "A" are estimated to be as follows:

	Coaches	Cars
Units Required (Including Spares)	481	653
Miles Operated Annually	13,300,000	28,796,508

The number of cars and car miles shown for the train operation are on the assumption that all of the trains would be made up with the new type of car as discussed herein. If some of the older cars are retained in service these figures would be changed somewhat. The estimated requirements for the coach operation includes the extensions over the surface. Pending definite disposition of the present uneconomical operation on the Kenwood and Stock Yards branches, it has been assumed that the operation will be part of the surface division, possibly utilizing the elevated structure inside the Stock Yards.

Use of Present Steel Cars

There are at present 456 all-steel cars owned by the Chicago Rapid Transit lines. They have, in general, the safety features required for modern train operation and, where not so fitted, may be adapted to remote door control. A considerable portion of the immediate investment required could be saved by the use of these cars for rush hour service, using the new cars to take care of the base operations.

These older steel cars would not have the capacity of a new car; therefore, a greater number would be required. Assuming a maximum rush hour capacity of 80 passengers per car, these 456 old units would be equivalent to 365 new cars in capacity, requiring the purchase of about 290 new cars. The smaller capacity would also require additional mileage, it being estimated that this added service would be about 1,200,000 car miles annually, which, if added to the 28,800,000 car miles shown above, would make a total of 30,000,000 car miles to be operated annually by the rapid transit trains.

The Complete Plan

In Plan "A" as in Plan "1" the benefit to city-wide service by coordinating suburban railroad routes with local feeder service will be realized. Rapid transit service will also be augmented by the system of surface express bus lines. The direct benefit of such a transportation plan is illustrated in Figure 51, which shows the additional area that will be brought within the 35 minute zone from the loop. A total of 580,000 population and an area of 33.9 square miles would be brought within this 35 minute zone determined by the local transit service, making travel a less tedious and more comfortable journey. An additional 242,000 population and 15.2 square miles would be brought within the 35 minute zone by the suburban railroad service coordinated with the local transit system.

The routes of the rail operation, high speed and surface divisions in the central business district are shown in Figure 52. The converging of the rail lines to the various subways is of particular interest.

Public Benefits

The superhighway coaches will provide modern, fast and comfortable service to most of the lines on the west and northwest sides of the city and enable many persons to avail themselves of direct rapid transit operation by extension of these lines to areas where such service is now greatly needed, particularly along North, Central and Milwaukee Avenues.

There is no question but that a modern train operation would be welcome by the riding public on the lines serving the north, south and west sides of the city and that there would be a substantial increase in their patronage. This corresponds with the experience of steam railroads with their streamline trains and with the experience obtained through the operation of new street cars of the P. C. C. type

on Madison Street in Chicago and elsewhere. Such riding attracted to the improved rapid transit service will relieve traffic congestion on surface roadways to some extent. The State Street subway will eliminate the slow journey around the loop and provide more direct connections from the north and south to the west side lines. The loop structure will be eliminated on Lake Street and Wabash Avenue and this will improve property values and provide additional street space by removing the columns now in the roadways. The west side street car subways will improve speeds and will afford the street space necessary to the downtown routing of the west side superhighway coaches. Removing the car tracks and eliminating the roadway loading of street cars will greatly improve conditions in this area and provide additional roadway space for street traffic movements.

Private Capital Required for Rapid Transit Operation

A summary of the investment required by the operating company under Plan "A" for the rapid transit operation is shown herewith:

SUMMARY OF RAPID TRANSIT INVESTMENT REQUIRED—PLAN "A"

First 4 Years—	
290 Modern Cars @ $22,500 per car	$ 6,525,000
481 Coaches @ $18,000 per coach	8,658,000
Buildings @ $1,500 per coach	721,500
Shop Equipment @ $200 per coach	96,200
Service Cars @ $200 per coach	96,200
Spare Units @ $200 per coach	96,200
Deferred Repairs to Structure	2,000,000
Block Signals	900,000
Improving Old Equipment, etc.	1,100,000
Total	$20,193,100
Fifth to Ninth Years (Inclusive)—	
Equipping State Street Subway	$ 1,150,000
Connections to Subway	600,000
Curve Improvements	1,000,000
Station Relocation	800,000
Noise Elimination	2,000,000
Structure Improvements	625,000
Total	$ 6,175,000
Grand Total—9 Years	$26,368,100

The above includes the superhighway coaches necessary for the extensions proposed over the surface in outlying areas.

Private Capital Required—Combined Operation

The expenditures required for the modernization of the surface division as it

would be operated under Plan "A" has been outlined in Chapter V. The resultant figures combined with the rapid transit requirements are as follows:

COMBINED COMPANY EXPENDITURES—FIRST 9 YEARS—PLAN "A"

Passenger Equipment—Surface Lines	$44,097,400
Track Rehabilitation—Surface	15,075,000
Other Surface Line Improvements	10,379,600
Passenger Equipment—Motor Coach	2,700,000
Other Improvements—Motor Coach	108,000
Superhighway Coaches	8,658,000
Rapid Transit Cars	6,525,000
Other Rapid Transit Improvements	11,185,100
Total—9 Years	$98,728,100

Public Capital Required—Combined Operation

The improvements which will be public obligations under Plan "A" are summarized in the following:

SUMMARY OF PUBLIC FUNDS REQUIRED—PLAN "A"

Washington Street—Street Car Subway	$ 5,600,000
Jackson Street—Street Car Subway	4,400,000
State Street Rapid Transit Subway	18,000,000
Douglas Park Superhighway	4,700,000
Paulina Street Superhighway	7,400,000
Milwaukee and North Avenues Superhighway	6,060,000
Lake Street Superhighway	6,750,000
Randolph Street Superhighway	3,250,000
Coach Storage	1,000,000
Street Repaving—Surface Lines	3,875,000
Street Repaving—Superhighways	1,145,000
Total	$62,180,000

These estimates do not include the cost of the property to be acquired from the Chicago Rapid Transit Company.

Construction Program

The various steps in the proposed construction program for public improvements under Plan "A" may be visualized by referring to the series of maps, Figures 53 to 58 inclusive, which outline the construction progress during each year of the six-year construction period. These steps demonstrate the ability to carry out the work with little interference with normal transit service. In brief this program would be as follows:

In the *first year* construction should begin on the two west side street car subways as well as on the Randolph Street superhighway.

During the *second year* the west side subways would be completed as well as the Randolph Street superhighway. Repaving of streets for temporary coach routes serving the Douglas Park and Milwaukee Avenue superhighways should be carried out during this year.

In the *third year* the Randolph Street superhighway would be opened for operation with Washington and Warren Boulevards and relieving traffic conditions on the west side. In that year the Douglas Park, Milwaukee Avenue and Paulina Street structures should be completed. Repaving of streets for temporary operation of the Lake Street coaches should be carried out during this year.

In the *fourth year* the Lake Street superhighway should be constructed so as to be ready for operation in the following year.

In the *fifth year* construction would be started on the north and south rapid transit subway in State Street.

In the *sixth year* the construction of the State Street subway would be completed ready for operation the following year.

Construction of the State Street subway is shown as beginning in the fifth year. Its construction has been deferred until this date so as to impose no excessive financial program upon the city and to minimize disturbance to general traffic and to business. It is entirely feasible from an engineering standpoint to construct the State Street subway simultaneously with the other two subways. The decision as to when the State Street subway shall be built is one of policy which rests with your committee and is dependent largely upon the city's current ability to arrange financing.

Alternate to the Milwaukee Avenue Superhighway

It should be noted that a new elevated superhighway structure is proposed to be constructed along Milwaukee Avenue from a point just northwest of the intersection of Lake Street, Canal Street and Milwaukee Avenue to a connection with the existing Logan Square elevated structure near Ellen Street. Over this route would be operated superhighway coaches from terminals near city limits along Milwaukee Avenue and along North Avenue replacing the existing Logan Square and Humboldt Park elevated railroad service and extending same to the northwest and west. The greatest traffic on trains during any half hour as indicated by counts taken during the second week of December, 1936 on the Humboldt Park and Logan Square branches totals approximately 4,500 passengers. This was during a week of maximum use. It is conservatively estimated that the extension of the Humboldt Park branch and Logan Square branch services as proposed herein along North Avenue and Milwaukee Avenue would ultimately result in an increase of this traffic during the maximum half hour period by about 2,000 passengers, thus making the total traffic to be accommodated 6,500 passengers. With an average load of 85 passengers per coach, this traffic would require the operation of 76 coaches during the maximum 30 minute period on headways of approximately 24 seconds. In addition these proposed elevated highways would carry the large volume of automobile traffic from the west and northwest.

There is some question as to whether this number of units could be added to the existing traffic at the three-way intersection of Lake Street, Canal Street and Milwaukee Avenue and be operated successfully. In view of this condition an alternate route for a portion of this express bus traffic could be located along Kinzie Street, Grand Avenue or some other street north of Lake Street, from which street the coaches could then run south to the loop.

A further factor to be considered is the probable continued rapid development of the northwest side. As has been discussed elsewhere, there is an opportunity for vastly improving local transit service throughout this entire area through the operation of express bus or limited stop routes along Addison Street and other thoroughfares which, with a convenient transfer to the Logan Square rapid transit line, would afford a material improvement in travel time from these areas to the central business district. It seems likely, therefore, that the rapid transit service extending from the loop district to the northwest may develop steadily to the point where it is of equal or greater importance than that extending directly west from the loop district. Should this be the case then there would be a still further increase in the number of superhighway coaches required to be operated to serve this important district.

There is the further consideration that, with the increase in the number of superhighway coach units operated on the proposed structure, there would be a diminishing opportunity for its use by general automobile traffic and, therefore, one of the advantages of proposed superhighway development would be to some extent decreased.

For these reasons, an alternate but more expensive plan for rapid transit train operation has been developed for the Logan Square and Humboldt Park services. This plan includes the same features as Plan "A" except, that instead of the Milwaukee Avenue superhighway it contemplates a two-track subway in Milwaukee Avenue from the Logan Square elevated structure at Ellen Street to a terminal in the downtown district at Dearborn and Van Buren Streets. At Logan Square there would be a subway providing convenient transfer for passengers from street cars and buses to rapid transit trains. At the Humboldt Park terminal, the operation of express buses from west North Avenue over a ramp to delivery at elevated platform level would be provided to facilitate the transfer movements. The operation to and in the central area would be by means of a subway in Milwaukee Avenue, Lake Street and Dearborn Street as set out in detail as part of Plan "1" (Chapter VII). However, as the construction of a connecting subway in Van Buren Street to the Garfield Park elevated railroad is proposed for a future date, it would be necessary in lieu thereof, to construct a stub terminal in Dearborn Street extending from a point 100 feet south of the south line of Jackson Street—south a distance of 750 feet—in which three terminal tracks would be constructed to provide adequately for the switching of trains. This rapid transit train alternate would involve additional capital expenditures as indicated in the following tabulation:

NET CHANGE IN PUBLIC EXPENDITURES REQUIRED UNDER PLAN "A" WITH THE CONSTRUCTION OF THE MILWAUKEE AVENUE SUBWAY AS AN ALTERNATE TO THE MILWAUKEE AVENUE SUPERHIGHWAY

Subway Terminal in Logan Square—portion in public property	$ 1,890,000	
Two-track Rapid Transit Subway along Milwaukee Avenue, Lake Street and Dearborn Street from connection with Logan Square Elevated Structure near Ellen Street to a three-track stub terminal near Van Buren Street	18,500,000	
Gross Additional Cost		$20,390,000
Humboldt Park Superhighway from North Avenue west to California Avenue to the Logan Square Superhighway	$ 590,000	
Logan Square Superhighway from terminal to North Avenue	1,330,000	
Milwaukee Avenue Superhighway from North Avenue to a point near Lake Street	4,140,000	
Total Deductions		$ 6,060,000
Net Additional Cost		$14,330,000

While this alternate involves some additional capital it has certain compensating benefits. There would be eliminated from operation on the crowded streets of the loop district a probable total of 76 buses during the maximum 30 minutes in the rush hour initially. The running time of rapid transit trains from the Logan Square terminal to the loop utilizing modern equipment and operating in the proposed subway would be slightly less than the time required for this run utilizing superhighway coaches. However, it should be borne in mind that there will be some inconvenience and loss of time in transferring from street cars or buses to rapid transit trains at the outer terminals. The delivery along Lake Street and Dearborn Street to Jackson Street on the south is equally as good as that provided by the superhighway coach line delivery along Lake Street and Randolph Street.

CHAPTER IX

MODERN RAPID TRANSIT FACILITIES—PLAN "B"

COMPLETE SUPERHIGHWAY COACH SERVICE COORDINATED WITH IMPROVED LOCAL AND EXPRESS SURFACE FACILITIES, WITH SUBWAYS THROUGH THE CENTRAL BUSINESS DISTRICT FOR STREET CAR OPERATION

Mayor Kelly in his statement of January, 1937 suggested:

> "The ultilization and coordination of such portions of existing elevated structures as may be determined to be feasible, economical and advisable for highway purposes after thorough survey and study."

Pursuant to this suggestion we have made a study to ascertain the feasibility, practicability and economy of converting all elevated structures of the Chicago Rapid Transit system into superhighways. In this study it was assumed that superhighway mass transit coaches would operate over these converted elevated structures, their routes being extended into outlying districts over the surface beyond the present limits of the structures.

As a result of this study, such plan is not recommended. However, a brief description of its physical layout and the basic reasons for its rejection will be of interest.

Plan "B" assumes the conversion into superhighways of the following branches of the elevated railway system:

1. Douglas Park
2. Garfield Park
3. Logan Square and Humboldt Park
4. Lake Street
5. Paulina Street
6. Jackson Park
7. Englewood and Normal Park
8. Northwestern Elevated
9. Ravenswood

The plan also assumes the construction of three street car subways, as follows:

1. Washington Street
2. Jackson Street
3. State Street

The surface facilities would be modernized as provided for in Plan "A", the only modification being that fewer street cars and buses would be required over those surface routes where the superhighway coach routes would be extended. In outlying areas the coordination of surface facilities with suburban railroad facilities was also included.

The present elevated structures on Wells Street and Van Buren Street would be converted for use as highways, but the Lake Street and Wabash Avenue sides of the loop structure would be removed. Storage facilities in Grant Park would be required similar to those proposed in Plan "A", (Chapter VIII) but with much larger capacity.

Under this plan the Chicago, North Shore & Milwaukee Railroad and the Chicago, Aurora & Elgin Railroad would be required to seek other entrances to the city or to terminate their service at the city limits.

In addition to other disadvantages of adopting Plan "B" at this time, is the fact that the expense involved, both public and private, is much greater than that required under either Plan "1" or Plan "A".

Plans	*Public Investment*	*Company Investment*	*Total*
"1"	$59,265,000	$109,832,500	$169,097,500
"A"	62,180,000*	98,728,100	160,908,100*
"B"	92,857,700*	110,379,200	203,236,200*

* The estimates of public investment for Plans "A" and "B" are exclusive of the cost of acquiring the portion of the properties of the Rapid Transit Company that are necessary for superhighway construction.

As shown above, the city-wide plan for conversion of all elevated railroad structures involves a greater public, as well as private, investment of captal. On some of the heavier lines, such as the Northwestern branch, practically the entire capacity of the superhighway would be required initially for the exclusive use of superhighway coaches during the rush hours. Excess capacity for future expansion of service, when required, would be very limited. A larger number of superhighway coaches would be required to operate over the surface of downtown streets.

Under the proposal of the Mayor the creation of a Chicago Transit Commission, with public control over future improvements in local transportation service will be assured. The new franchise ordinance can be so drafted as to permit changes in types of improvements so that if, after the completion of Plan "A" a further abandonment of elevated train service is indicated to be desirable, then such change in plan can be made.

In the meantime, the construction to be carried out under Plan "A" will require several years for the completion of its initial steps. There is no improvement proposed in Plan "A" which will not permit of the ultimate completion of Plan "B" at any later time if and when it is determined to be warranted.

Again quoting from the statement of Mayor Kelly made in January last, the following text clearly sets out a sound policy regarding future plans:

> "In these days of rapidly changing methods, rigid details of type of future improvement have no place in long time franchises, if we are to hope to keep abreast of the new methods; public regulation by the Commission and authority over future improvements provide the necessary safeguards."

Plan "B", therefore, is not recommended for adoption at this time.

CHAPTER X

ANALYSIS OF REVENUES, EXPENSES AND CAPITAL REQUIREMENTS OF PROPOSED PLAN FOR MODERN TRANSIT

The plan and program of improvements herein presented contemplates the use of public funds to provide new permanent structures for high speed operation either as subways or as elevated highways. The use of company funds is contemplated for equipping the subways; for the rehabilitation of existing properties, to be retained in service; and for the purchase of much modern passenger equipment together with other additional facilities required for its operation.

The various items of expenditures shown in Tables 20 and 21 are classified under simple headings to indicate the use of the cash requirements rather than to present the details under the more involved accounting nomenclature. For example, the use of the words "Capital Additions" is without its usual accounting significance.

The rehabilitation and modernization of the properties of the company will require both the replacement of old tracks and cars with new tracks and cars as well as acquisition of new and additional cars and plant. For both of these purposes it is proposed that the company make full use of such an amount of cash as may be indicated from time to time by the depreciation reserves, together with cash taken from such funds as the company may have in hand when the ordinance is accepted. The use of these funds makes possible the financing of the entire program without resorting to the sale of bonds to secure additional funds.

These estimates have been projected far enough into the future to reasonably assure that the amount of cash invested from depreciation reserves in new plant and equipment will not be needed for replacement purposes during the period required for the system as a whole to become a seasoned property.

This plan of financial procedure, coupled with the use of equipment trust certificates for purchase of new passenger equipment, while presenting but one method of financing the recommended program, is of such a character as to lend itself to conforming with a modern system of accounting without changing the results as here presented.

Revenue Rides

It has been assumed that the total number of revenue passengers under either plan of modernization (Plan "1" or Plan "A") will be the same. The estimate of passengers to be carried is based on the conservative assumption that the present combined riding habit of 257 revenue rides per capita per annum will be continued for the first four years of operation. This factor is applied to the

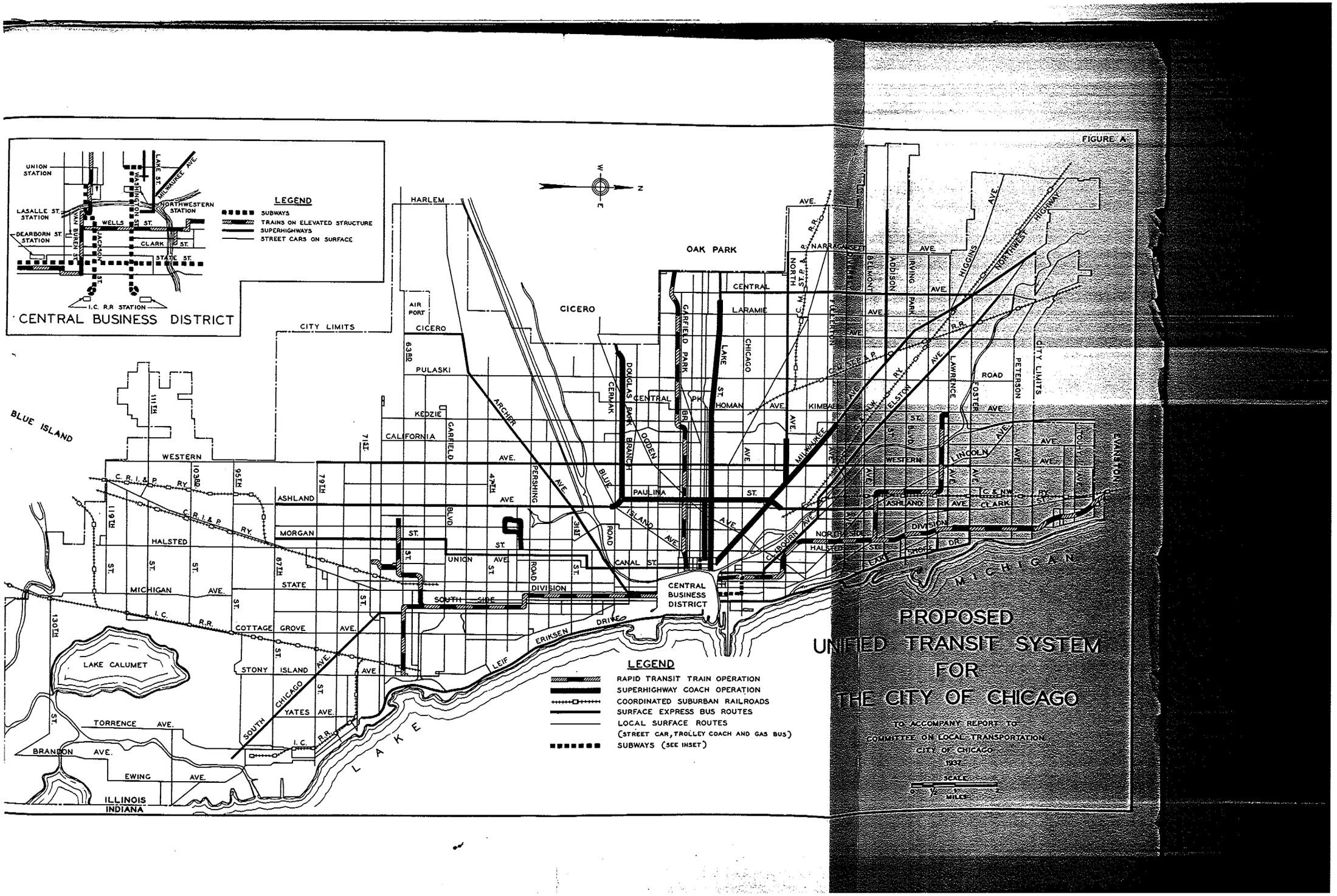
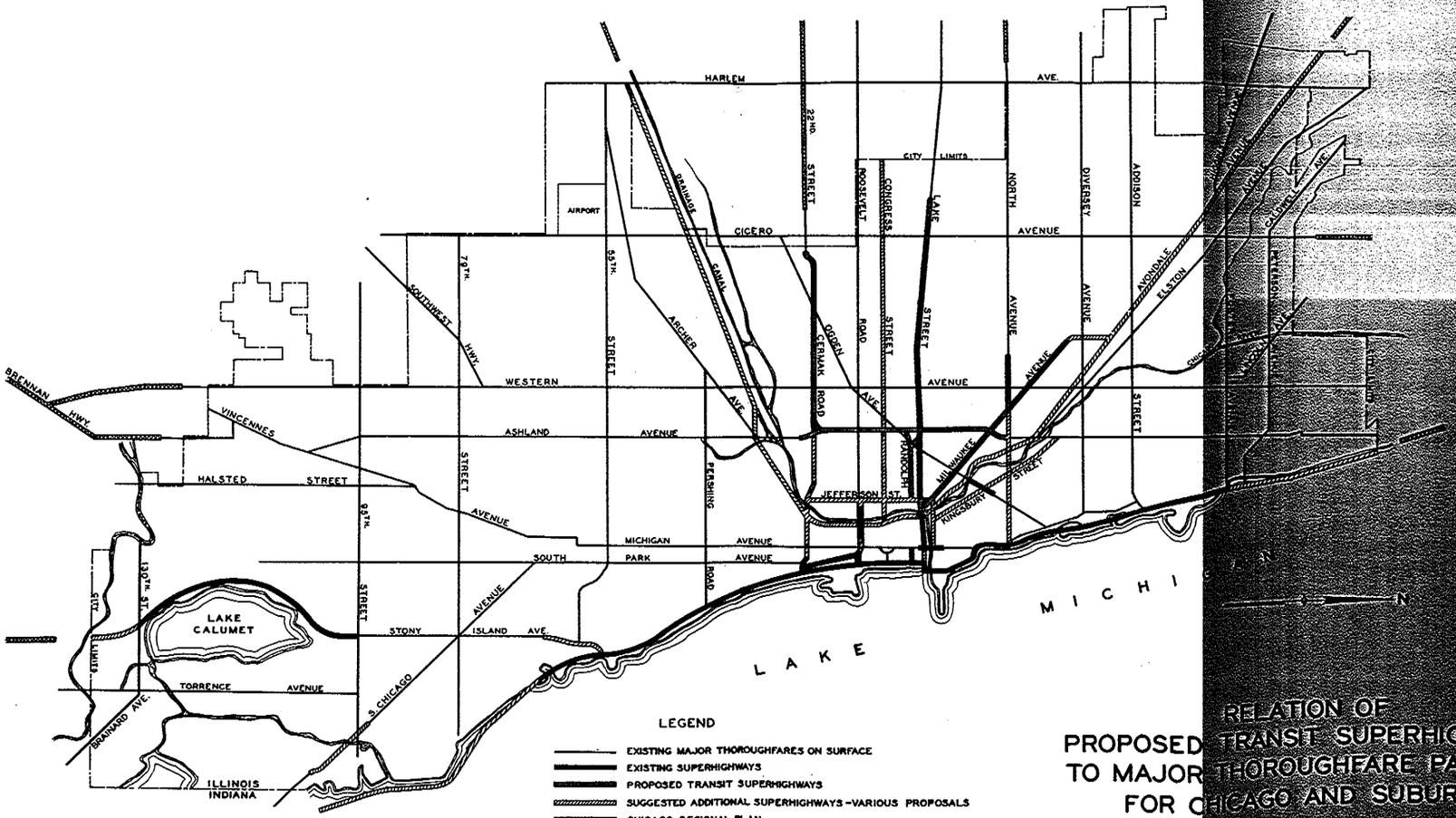


FIGURE A
CENTRAL BUSINESS DISTRICT
UNION STATION
LASALLE ST. STATION
DEARBORN ST. STATION
LAKE ST.
MILWAUKEE AVE.
WASHINGTON ST.
NORTHWESTERN STATION
VAN BUREN ST.
WELLS ST.
JACKSON
CLARK ST.
STATE ST.
I.C. R.R. STATION
LEGEND
SUBWAYS
TRAINS ON ELEVATED STRUCTURE
SUPERHIGHWAYS
STREET CARS ON SURFACE
PROPOSED
UNIFIED TRANSIT SYSTEM
FOR
THE CITY OF CHICAGO
TO ACCOMPANY REPORT TO
COMMITTEE ON LOCAL TRANSPORTATION
CITY OF CHICAGO
1937
SCALE
0 ½ 1 2
MILES
LEGEND
RAPID TRANSIT TRAIN OPERATION
SUPERHIGHWAY COACH OPERATION
COORDINATED SUBURBAN RAILROADS
SURFACE EXPRESS BUS ROUTES
LOCAL SURFACE ROUTES
(STREET CAR, TROLLEY COACH AND GAS BUS)
SUBWAYS (SEE INSET)
CENTRAL BUSINESS DISTRICT
HARLEM
OAK PARK
CICERO
AIR PORT
CITY LIMITS
BLUE ISLAND
ILLINOIS
INDIANA
LAKE MICHIGAN
LAKE CALUMET
EVANSTON
WESTERN AVE.
ASHLAND AVE.
HALSTED ST.
MORGAN ST.
UNION ST.
CANAL ST.
STATE ST.
DIVISION ST.
SOUTH SIDE
NORTH SIDE
MICHIGAN AVE.
COTTAGE GROVE AVE.
STONY ISLAND AVE.
TORRENCE AVE.
BRANDON AVE.
EWING AVE.
YATES AVE.
CENTRAL AVE.
LARAMIE AVE.
KEDZIE
CALIFORNIA
PULASKI
KIMBALL
HOMAN
CLARK ST.
DIVISION
ARCHER
OGDEN
ELSTON
LINCOLN
LAWRENCE
FOSTER
PETERSON
ROAD
HIGGINS
NORTHWEST HIGHWAY
ERIKSEN DRIVE
LEIF
C.R.I.&P. RY.
I.C. R.R.
C.M.ST.P.&P. R.R.
C.&N.W. RY.
CHICAGO SOUTH SHORE & SOUTH BEND R.R.
GARFIELD PARK
DOUGLAS PARK
GERMAK
PERSHING
BLUE ISLAND
NARRAGANSET
BELMONT
ADDISON
IRVING PARK
111TH
103RD
95TH
87TH
79TH
71ST
63RD
47TH
31ST
130TH
119TH

FIGURE 7



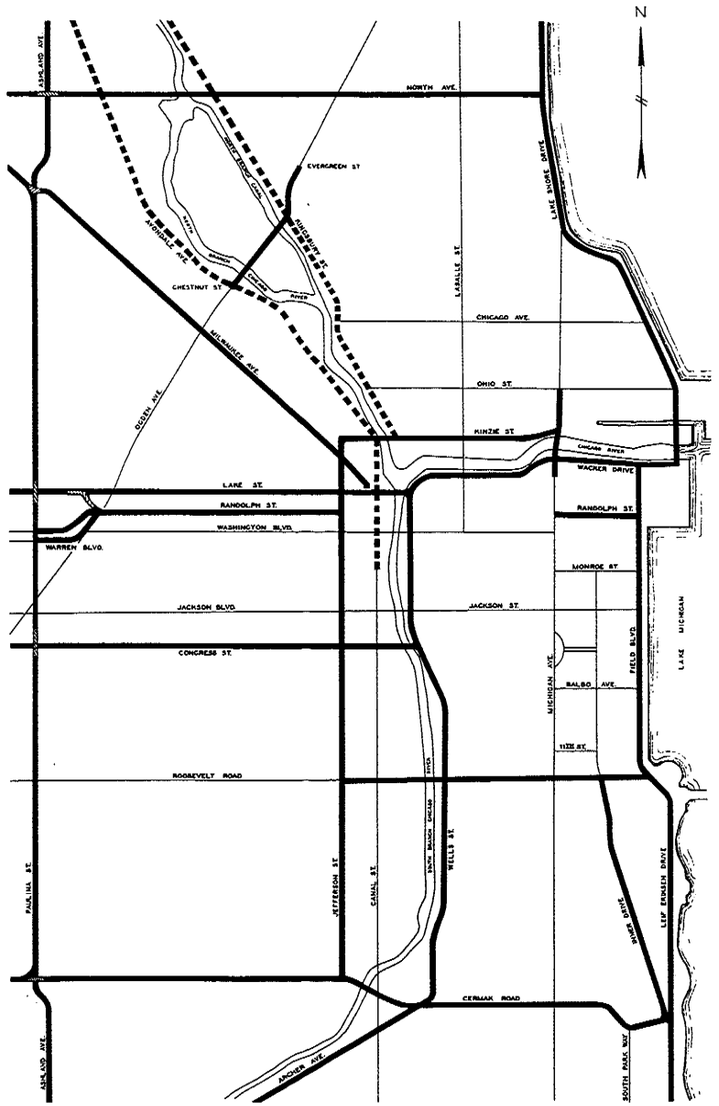
LEGEND

- EXISTING MAJOR THOROUGHFARES ON SURFACE
- EXISTING SUPERHIGHWAYS
- PROPOSED TRANSIT SUPERHIGHWAYS
- SUGGESTED ADDITIONAL SUPERHIGHWAYS - VARIOUS PROPOSALS
- CHICAGO REGIONAL PLAN

RELATION OF
PROPOSED TRANSIT SUPERHIGHWAYS
TO MAJOR THOROUGHFARE PATTERN
FOR CHICAGO AND SUBURBS

REPORT TO
COMMITTEE ON RAPID TRANSPORTATION
CITY OF CHICAGO
1945

FIGURE 8



LAYOUT SHOWING POSSIBILITIES OF ULTIMATE SUPERHIGHWAY DEVELOPMENT IN CENTRAL BUSINESS AREA

TO ACCOMPANY REPORT TO
COMMITTEE ON LOCAL TRANSPORTATION
CITY OF CHICAGO
1937

SCALE IN FEET
0 400 800 1600

LEGEND
- EXISTING & PROPOSED SUPERHIGHWAYS
- PROPOSED SUPERHIGHWAY – ALTERNATES
- EXISTING MAJOR THOROUGHFARES

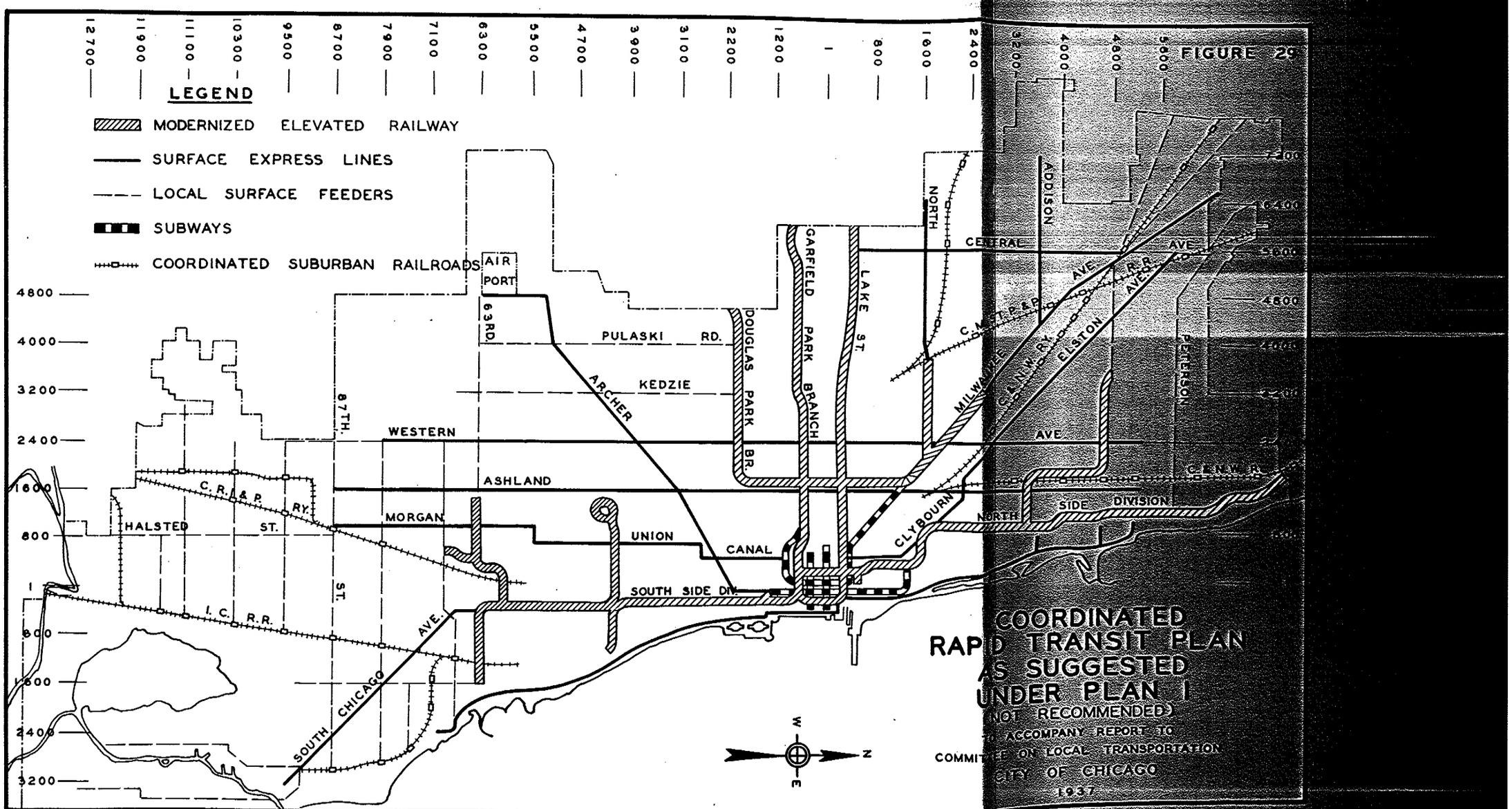


FIGURE 29

COORDINATED RAPID TRANSIT PLAN AS SUGGESTED UNDER PLAN I

(NOT RECOMMENDED)

TO ACCOMPANY REPORT TO

COMMITTEE ON LOCAL TRANSPORTATION

CITY OF CHICAGO

1937

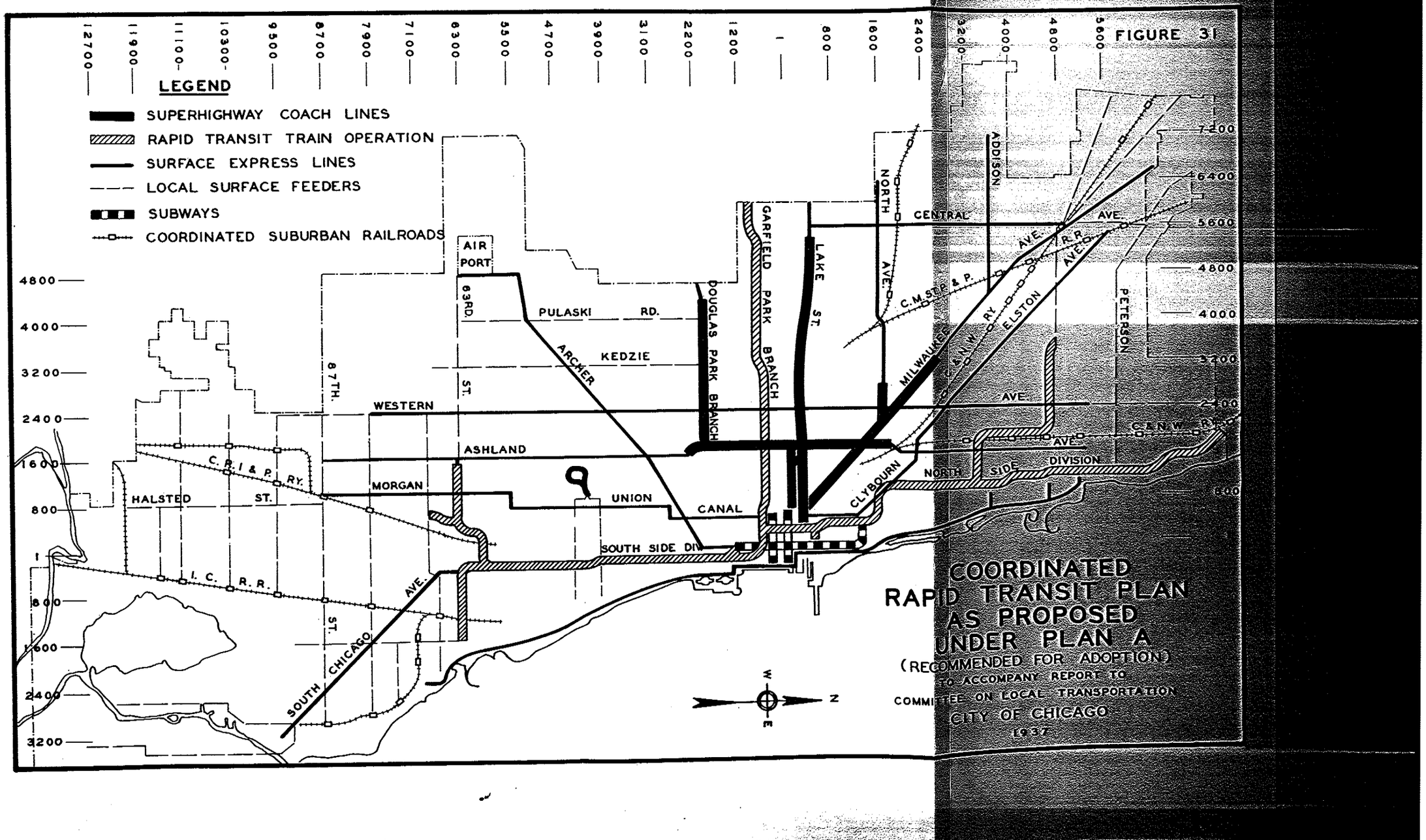
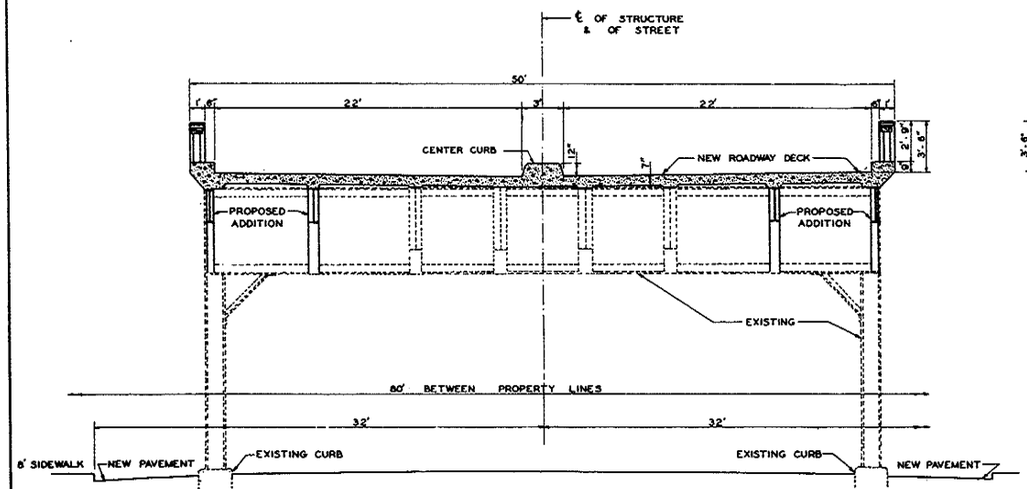


FIGURE 31
LEGEND
SUPERHIGHWAY COACH LINES
RAPID TRANSIT TRAIN OPERATION
SURFACE EXPRESS LINES
LOCAL SURFACE FEEDERS
SUBWAYS
COORDINATED SUBURBAN RAILROADS
AIR PORT
63RD. ST.
PULASKI RD.
KEDZIE
87TH. ST.
WESTERN AVE.
ASHLAND
MORGAN
HALSTED ST.
UNION
CANAL
SOUTH SIDE DIV.
SOUTH CHICAGO AVE.
I. C. R. R.
C. R. I. & P. RY.
ARCHER
DOUGLAS PARK BRANCH
GARFIELD PARK BRANCH
LAKE ST.
NORTH AVE.
CENTRAL AVE.
ADDISON
C. M. ST. P. & P. R. R.
MILWAUKEE AVE.
C. & N. W. RY.
ELSTON
PETERSON
C. & N. W. R. R.
NORTH SIDE DIVISION
CLYBOURN
COORDINATED RAPID TRANSIT PLAN AS PROPOSED UNDER PLAN A
(RECOMMENDED FOR ADOPTION)
TO ACCOMPANY REPORT TO
COMMITTEE ON LOCAL TRANSPORTATION
CITY OF CHICAGO
1937

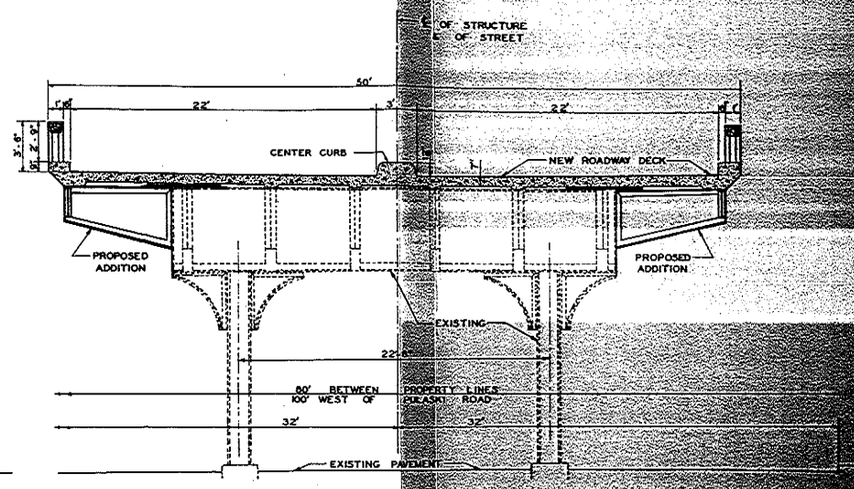
FIGURE 33



DOTTED LINES INDICATES EXISTING STRUCTURE

EXISTING CURB COLUMN SECTION

BETWEEN CLINTON STREET AND TALMAN AVENUE



EXISTING ROADWAY COLUMN SECTION

BETWEEN TALMAN AVENUE AND LARAMIE AVENUE

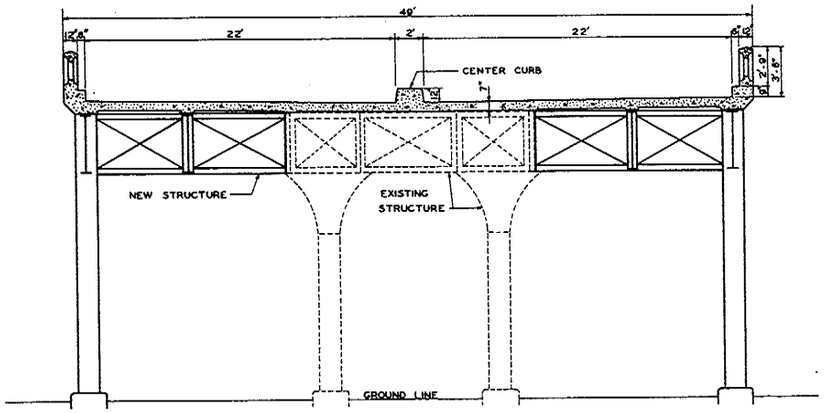
TYPICAL SECTIONS

LAKE STREET ELEVATED STRUCTURE CONVERTED TO FOUR LANE ELEVATED HIGHWAY

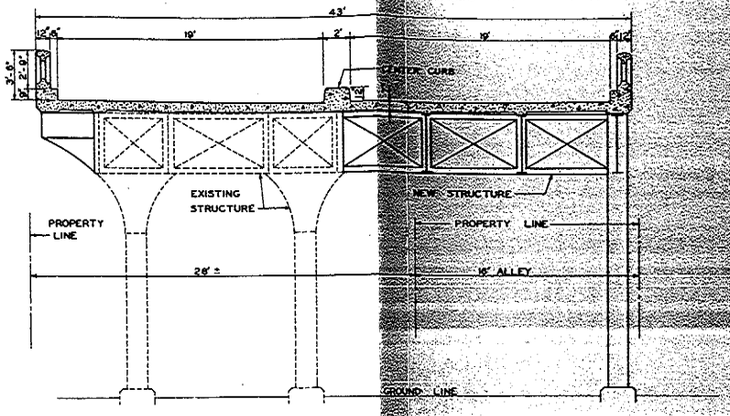
TO ACCOMPANY REPORT TO
COMMITTEE ON LOCAL TRANSPORTATION
CITY OF CHICAGO
1937

SCALE IN FEET
0 2 4 8

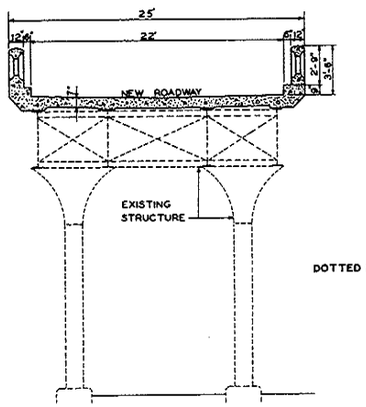
FIGURE 3-6



CONVERSION OF EXISTING TWO TRACK STRUCTURE
TO FOUR LANE STRUCTURE

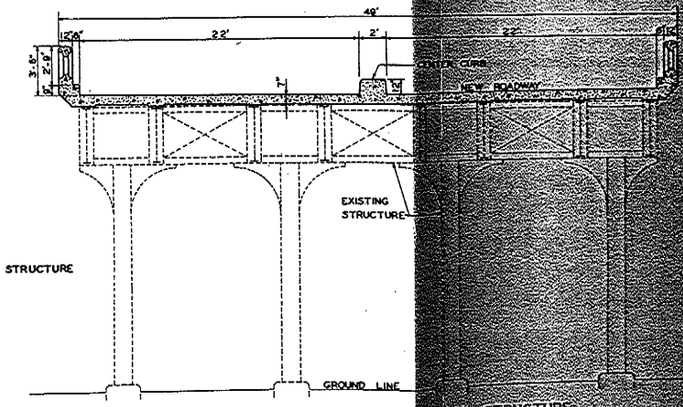


CONVERSION OF EXISTING TWO TRACK STRUCTURE
TO FOUR LANE STRUCTURE IN RESTRICTED RIGHTS OF WAY



CONVERSION OF EXISTING TWO TRACK STRUCTURE
TO TWO LANE STRUCTURE

DOTTED LINES INDICATE EXISTING STRUCTURE



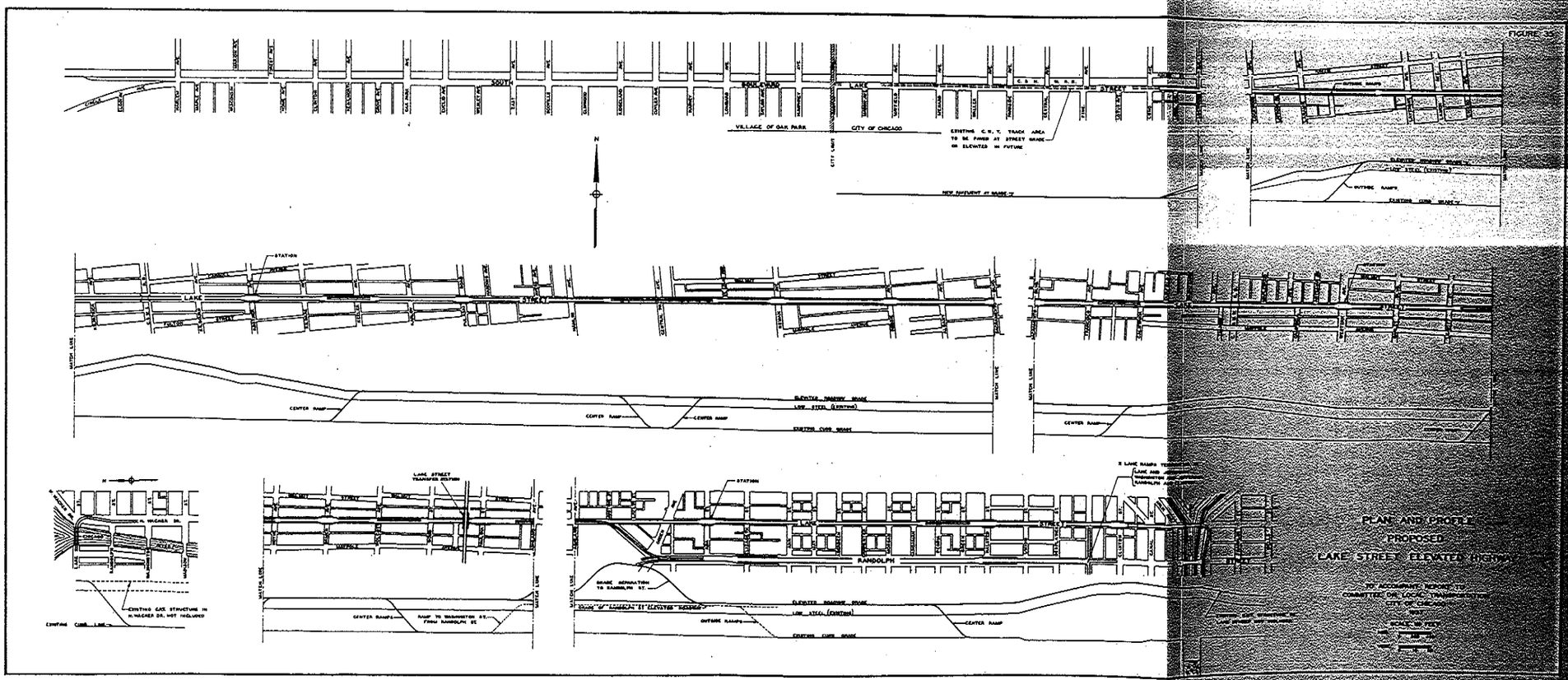
CONVERSION OF EXISTING FOUR TRACK STRUCTURE
TO FOUR LANE STRUCTURE

TYPICAL SECTIONS OF VARIOUS ELEVATED STRUCTURES CONVERTED TO ELEVATED HIGHWAYS

TO ACCOMPANY REPORT TO
COMMITTEE ON TRANSPORTATION
CITY OF CHICAGO

SCALE IN FEET
0 1 2

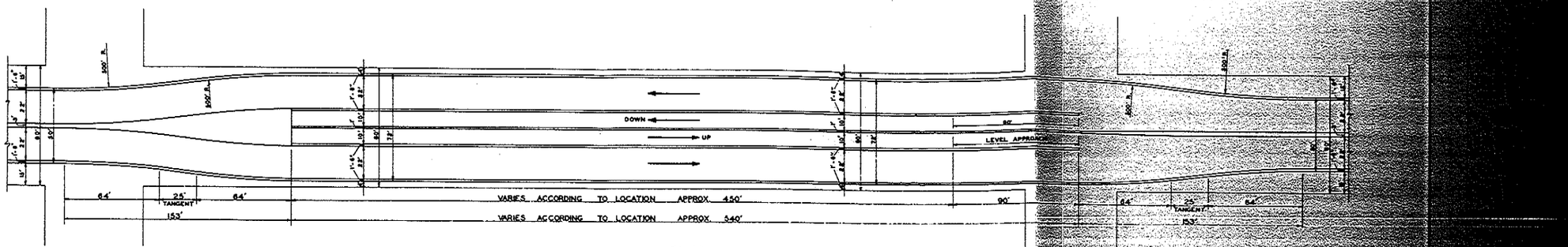
FIGURE 35



PLAN AND PROFILE
PROPOSED
LAKE STREET ELEVATED HIGHWAY

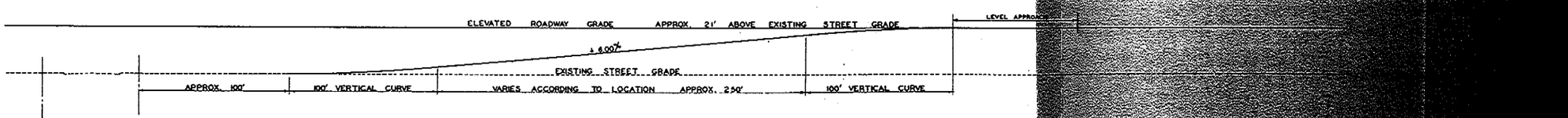
TO ACCOMPANY REPORT TO COMMITTEE ON LOCAL TRANSPORTATION CITY OF CHICAGO

FIGURE 36



PLAN

SCALE 0 20 40 80 FEET

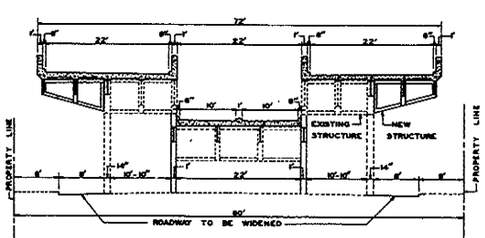


PROFILE

SCALES IN FEET

HOR. 0 20 40 80

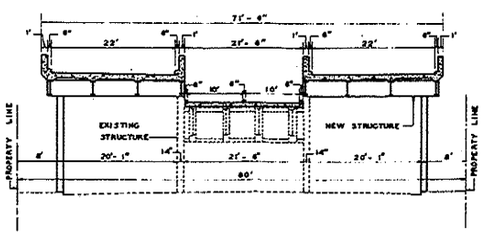
VERT. 0 10 20 40



SECTION OF CENTER RAMP STRUCTURE ON EXISTING CURB COLUMN SECTION

DOTTED LINES INDICATE EXISTING STRUCTURE

SCALE 0 5 10 20 FEET



SECTION OF CENTER RAMP STRUCTURE ON EXISTING ROADWAY COLUMN SECTION

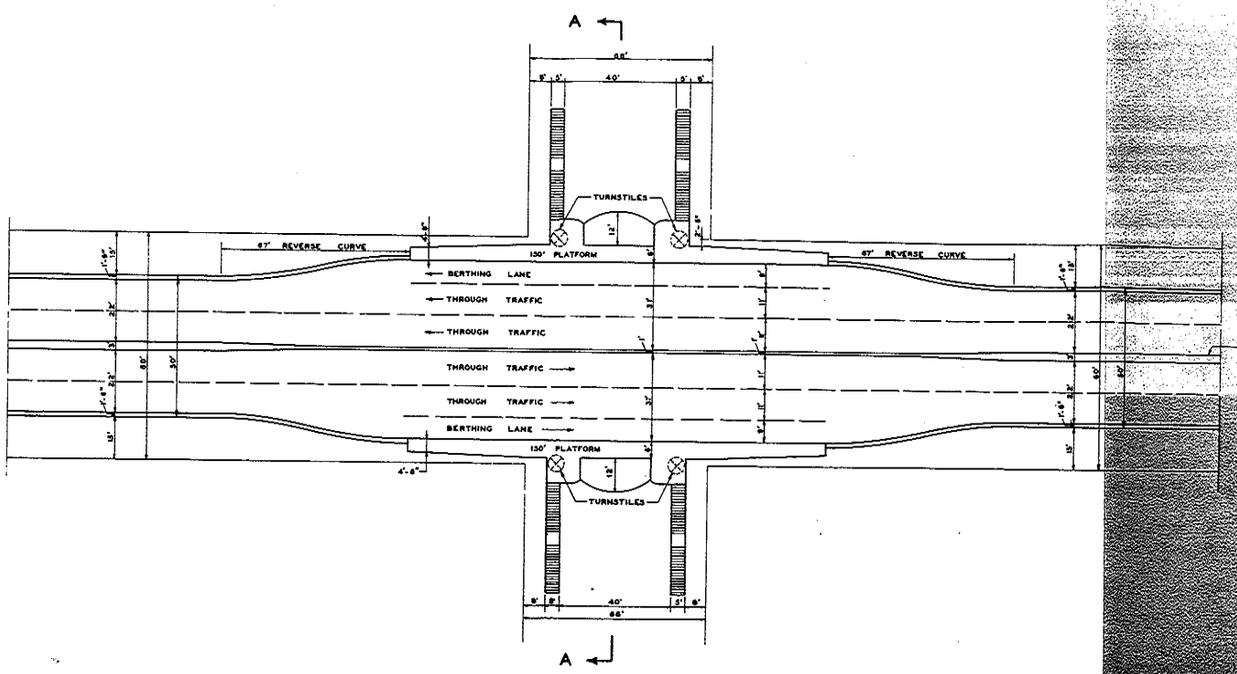
SCALE 0 5 10 20 FEET

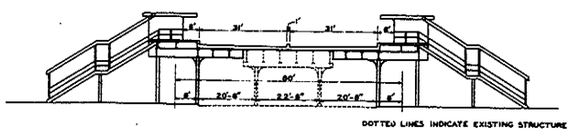
TYPICAL CENTER RAMP LAYOUT

CONVERTED ELEVATED HIGHWAYS

TO ACCOMPANY REPORT TO COMMITTEE ON LOCAL TRANSPORTATION CITY OF CHICAGO 1939

FIGURE 38





SECTION A-A

TYPICAL SUPERHIGHWAY STATION WITH BERTHING LANE

TO ACCOMPANY REPORT TO COMMITTEE ON LOCAL TRANSPORTATION CITY OF CHICAGO 1939

SCALE IN FEET

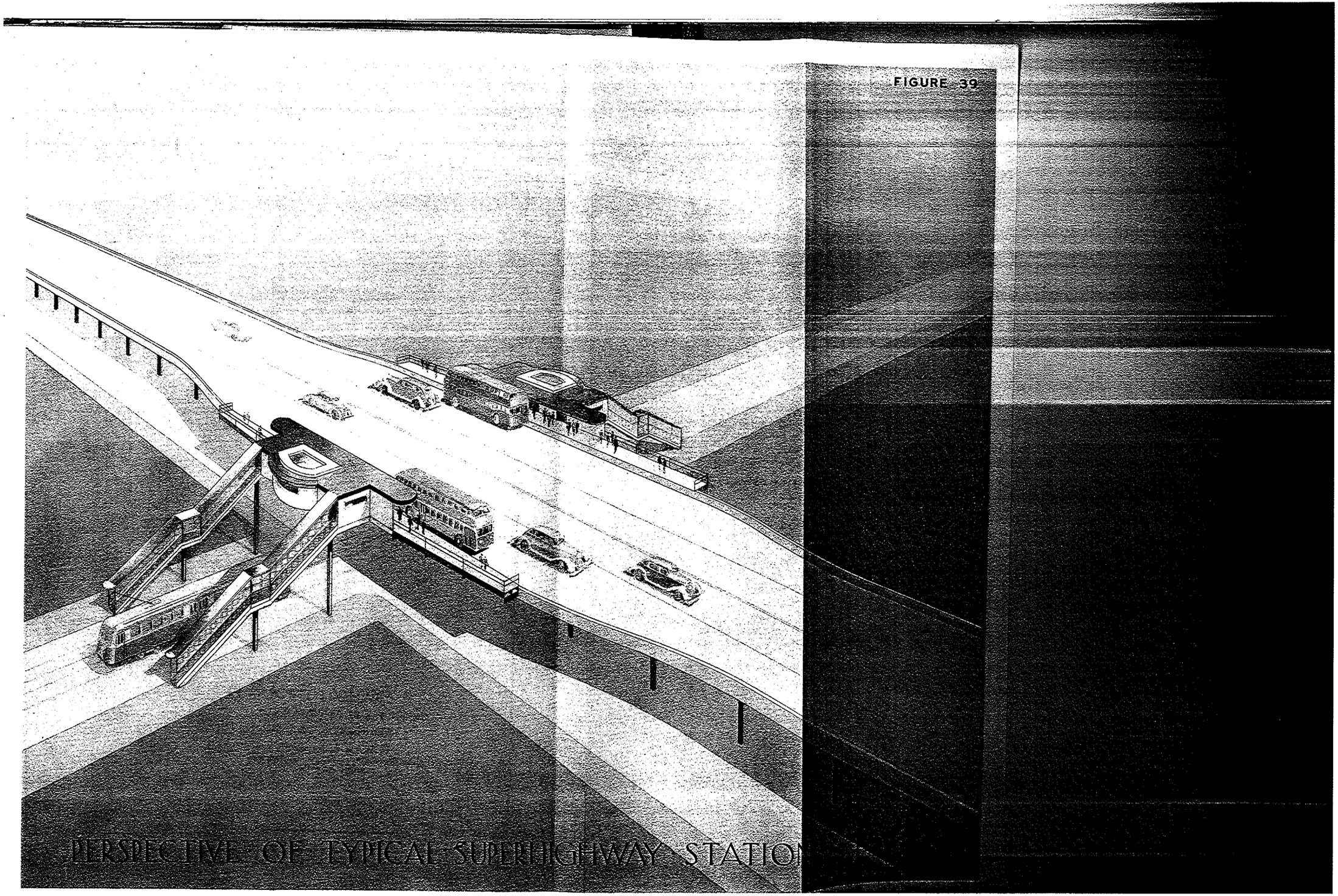


FIGURE 39

PERSPECTIVE OF TYPICAL SUPERHIGHWAY STATION

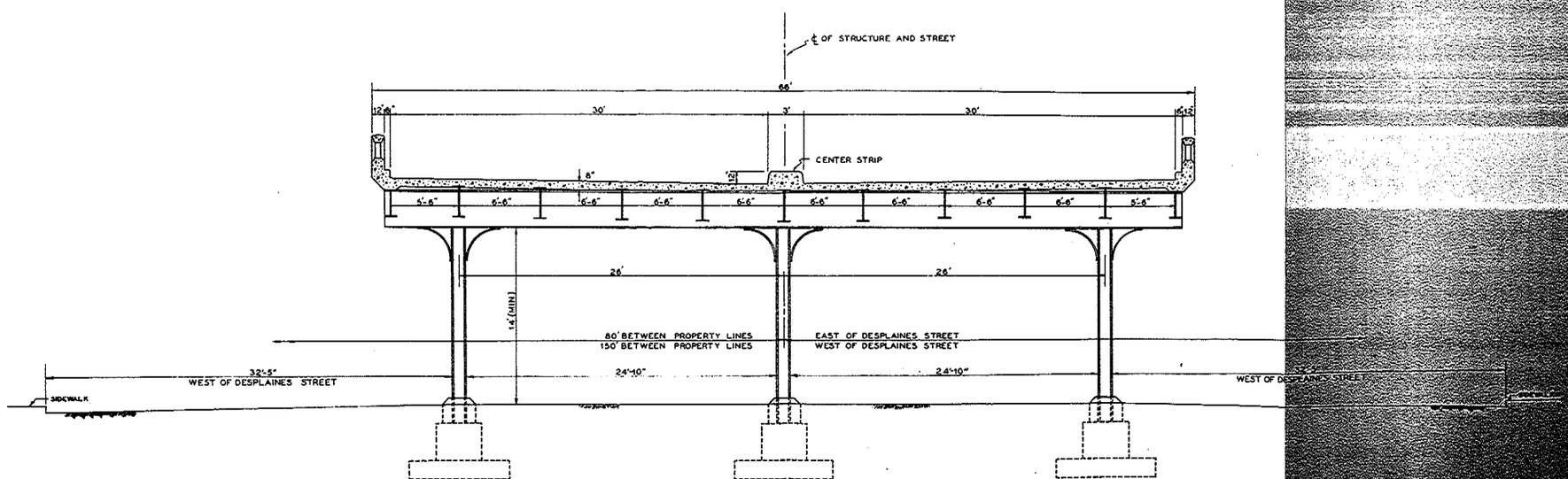
FIGURE 41

ELEVATED HIGHWAY PLAN
IN VICINITY OF UNION PARK
COMPLETE DEVELOPMENT

TO ACCOMPANY REPORT TO
COMMITTEE ON LOCAL TRANSPORTATION
CITY OF CHICAGO
1939

SCALE IN FEET

FIGURE 43

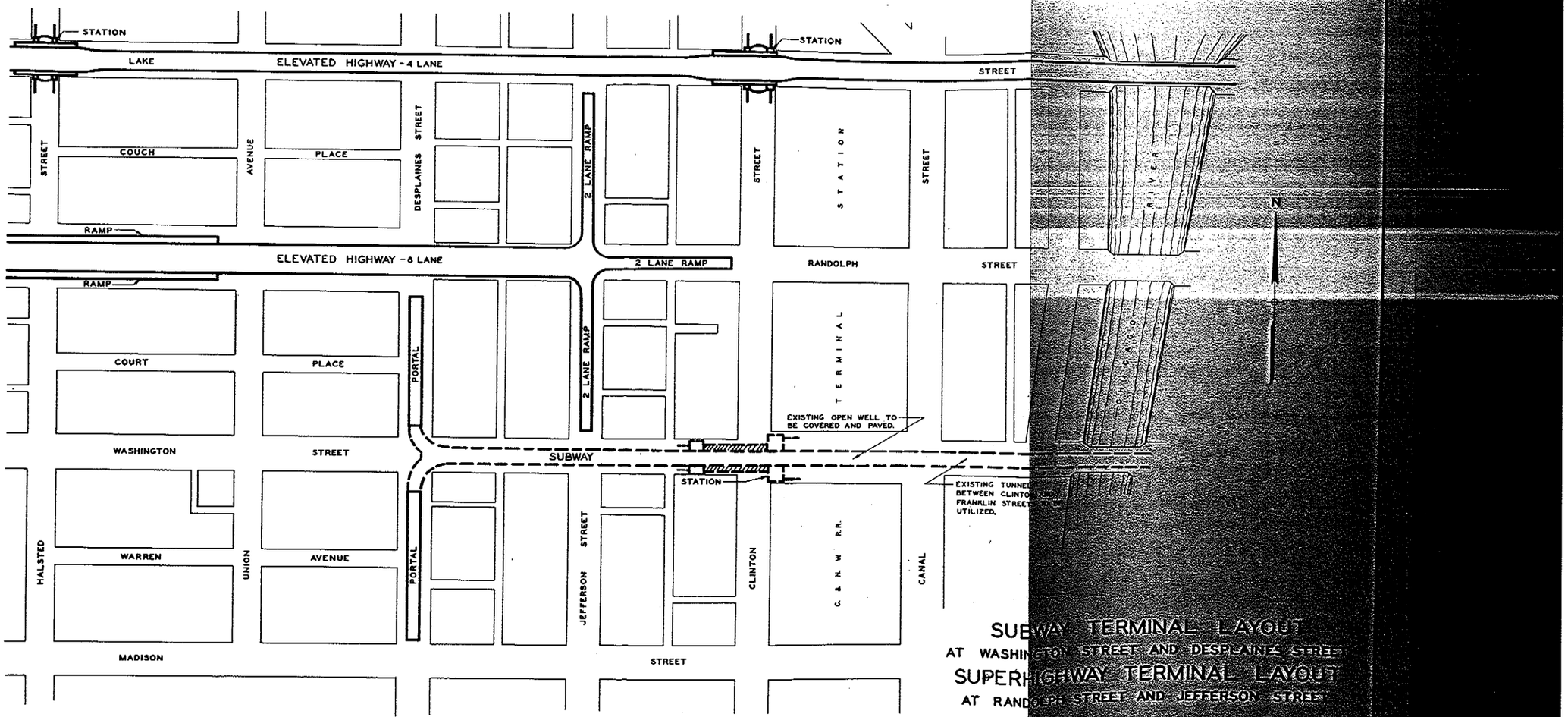


TYPICAL SECTION
SIX LANE ELEVATED HIGHWAY
IN RANDOLPH STREET

TO ACCOMPANY REPORT TO
COMMITTEE ON LOCAL TRANSPORTATION
CITY OF CHICAGO
1937

SCALE IN FEET

FIGURE 44

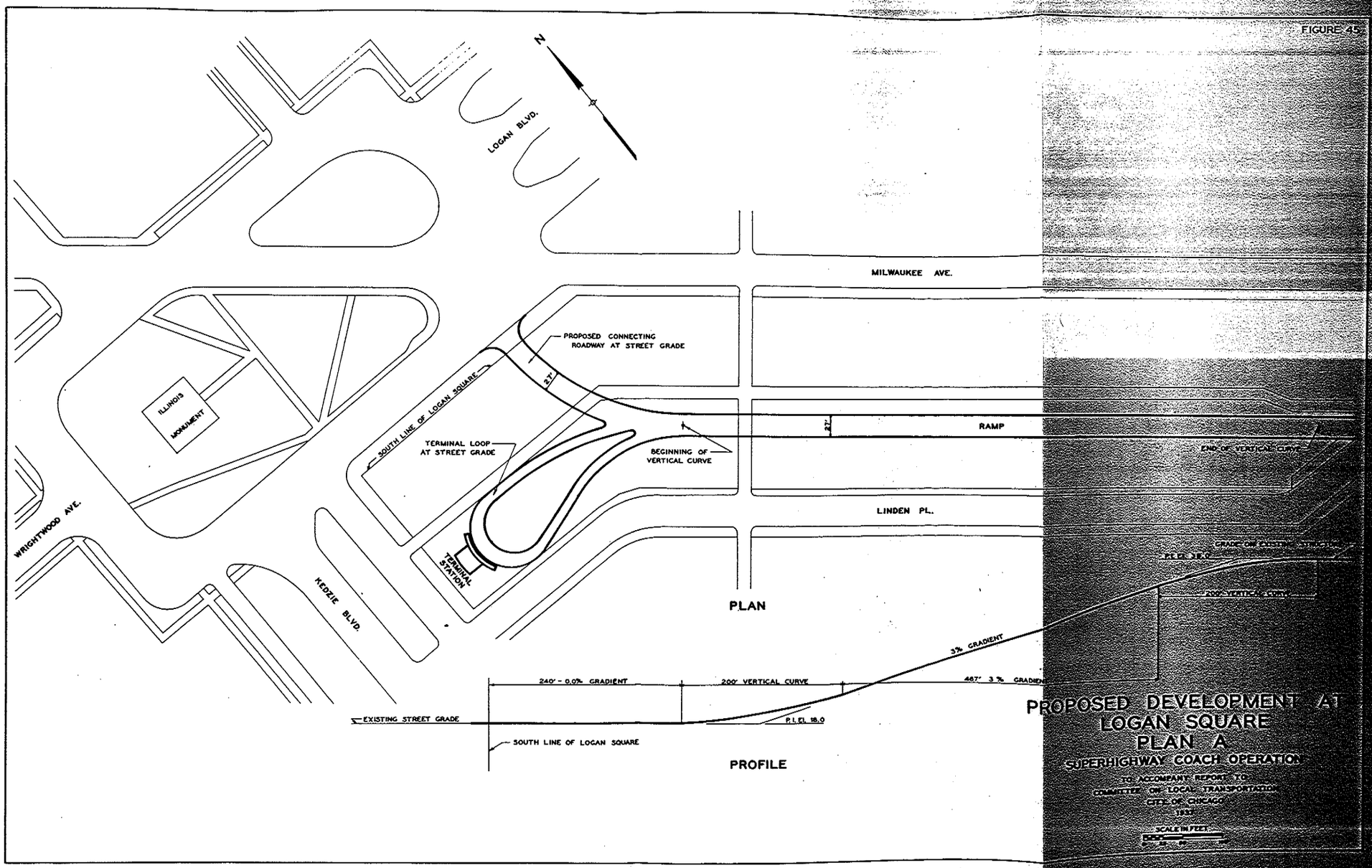


SUBWAY TERMINAL LAYOUT
AT WASHINGTON STREET AND DESPLAINES STREET
SUPERHIGHWAY TERMINAL LAYOUT
AT RANDOLPH STREET AND JEFFERSON STREET

TO ACCOMPANY REPORT TO
COMMITTEE ON LOCAL TRANSPORTATION
CITY OF CHICAGO
1939

SCALE IN FEET

FIGURE 45



PROPOSED DEVELOPMENT AT LOGAN SQUARE

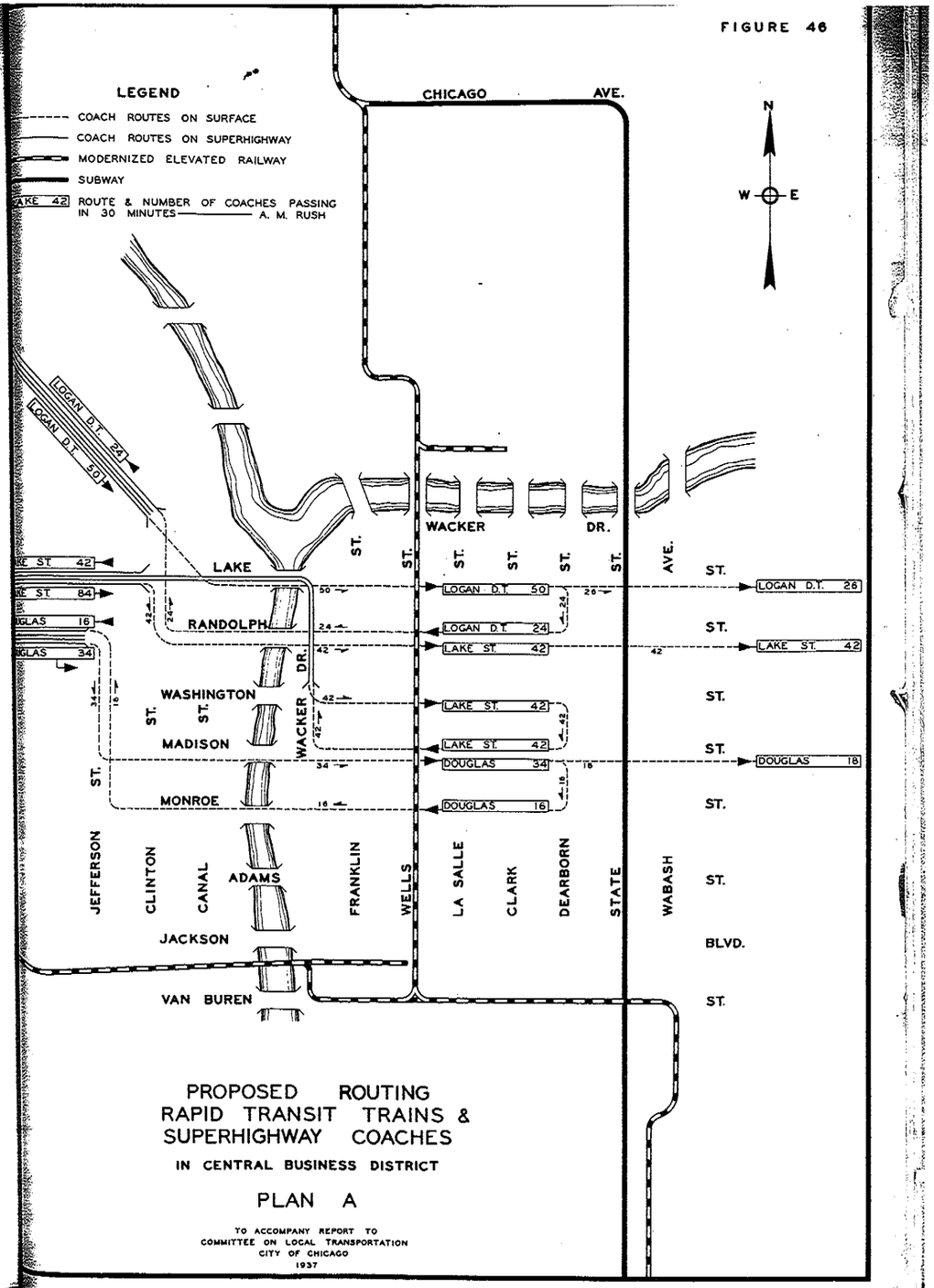
PLAN A

SUPERHIGHWAY COACH OPERATION

TO ACCOMPANY REPORT TO
COMMITTEE ON LOCAL TRANSPORTATION
CITY OF CHICAGO
1932

SCALE IN FEET

FIGURE 46

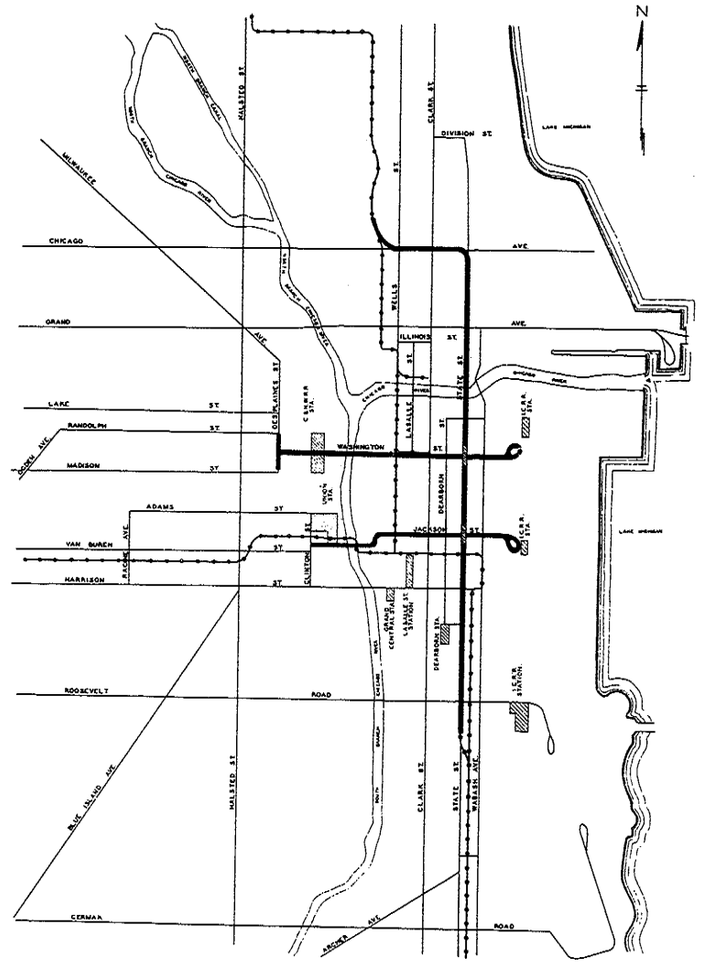


PROPOSED ROUTING
RAPID TRANSIT TRAINS &
SUPERHIGHWAY COACHES
IN CENTRAL BUSINESS DISTRICT

PLAN A

TO ACCOMPANY REPORT TO
COMMITTEE ON LOCAL TRANSPORTATION
CITY OF CHICAGO
1937

FIGURE 52


N
DIVISION ST
CHICAGO AVE
GRAND AVE
ILLINOIS ST
LAKE ST
RANDOLPH ST
WASHINGTON
MADISON ST
ADAMS ST
JACKSON
VAN BUREN
HARRISON ST
ROOSEVELT ROAD
CERMAK ROAD
WELLS
LASALLE
DEARBORN
CLARK ST
STATE ST
HALSTED ST
LAKE MICHIGAN
MILWAUKEE AVE
BLUE ISLAND AVE
ARCHER AVE
MAIN BRANCH CHICAGO RIVER
NORTH BRANCH CHICAGO RIVER
SOUTH BRANCH CHICAGO RIVER
CHICAGO RIVER
CHICAGO RIVER